

LIBRARY.
OR. MR. GENERAL'S OFFICE
Rec'd. 18
Section Shelf
250
M.C.

16
189

THE IRON AGE

A Review of the Hardware, Iron and Metal

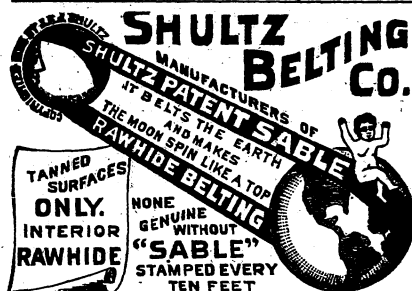
Published every Thursday Morning by David Williams, Nos. 96, 98, 100 & 102 Reade St., New York.

Vol. LI: No. 14.

New York, Thursday, April 6, 1893.

\$4.50 a Year, including Postage.
Single Copies, Ten Cents.

Reading Matter Contents.....page 818
Classified List of Advertisers.... " 146
Alphabetical Index to Advertisers " 150
Advertising and Subscription Rates " 149



Send for circular "I" to
SHULTZ BELTING CO.,
ST. LOUIS, MO.
NEW YORK, N. Y., 225 Pearl St., A. B. Laurence, Mgr.
BOSTON, MASS., 184 Summer St., G. J. Kelley, Mgr.
PHILADELPHIA, PA., 129 N. 3d St., J. Garnett, Mgr.

TUDOR IRON WORKS,

ST. LOUIS

Manufacturers of
Track Fastenings,
Boat Spikes,
Goldie Spikes. Mining Rails.

Every Hardware and Mill Supply Dealer
Should Sell Bristol's Patent



**STEEL BELT
LACING.**

Send for show
card, circular
and free samples
THE BRISTOLS' MFG. CO., Waterbury, Conn.
New York Office, 121 Liberty St.



SOLID BRAIDED CORDAGE.

All Kinds, Sizes and Colors.

SEND FOR SAMPLES.

Samson Cordage Works,
BOSTON, MASS.

THE WILLIAMS PRINTING CO., Commercial Printers and Binders

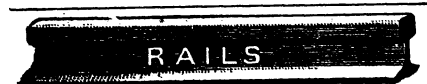
CATALOGUES A SPECIALTY.

96-102 READE STREET, NEW YORK.

TURNBUCKLES.



BRANCH OFFICE: **Cleveland**
36 Liberty St., **City Forge and Iron Co.,**
NEW YORK. CLEVELAND, O.



RAILS
CUT TO LENGTHS for Contractors',
Builders' and Mill use. **NEW** Steel Rails of
all sections; **SECOND-HAND** for relaying;
OLD for scrap use. Also all kinds of railroad
scrap.

WHEN BUYING WRITE TO US FOR PRICES.
J. H. RICHARDSON & CO.,
708 Penn Ave., Pittsburgh, Pa.

SMOKELESS PAPER SHELLS

Loaded with Nitro Powders, Schultze, E. C.
and American Wood.

—SOLD ONLY THROUGH DEALERS.—

SALMON



COLOR.

Made in 10, 12 and 16 gauge. Price-list on application.
Packed 25 in a box, 500 in a case.

—MANUFACTURED BY—

The Union Metallic Cartridge Co., BRIDGEPORT, CONN.

RANDOLPH & CLOWES, WATERBURY, CONN.,

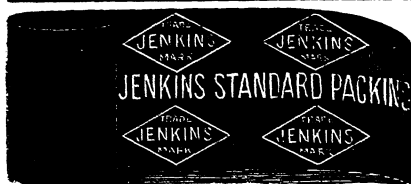
Manufacturers of Seamless Drawn Brass and Copper Tubing and Large Shells, Brazed
Tubes and Mouldings, Sheet Brass, Sheet Copper, German Silver.

—SOLE MANUFACTURERS OF—

Brown's Patent Seamless Drawn Copper House Boilers.

CANNOT COLLAPSE. WILL NOT LEAK.

Ordinary weight tested to 200 lbs., extra heavy to 300 lbs. pressure per square inch. Made of two Seam-
less Drawn Copper Shells. Handsomest, best and strongest and safest boiler in the market and cheapest in
the end. Send for circular and instructions to prevent accidents from freezing, &c., &c.



INCREASED SALES

Show that our customers appreciate the value
of improvements made in

JENKINS PACKING.

It can be used again and again. Does not **ROT**
or **BURN** out. Have you tried it recently? If
not, DO SO! Look for "Trade-Mark."

JENKINS BROS.,

New York, Philadelphia, Boston and Chicago

DRIPPING PANS. 40 Sizes. The best made. (Beaman's Patent Improved.)

MARYLAND ROASTER AND BAKER. { New and Effective.
Cheapest in the Market.

Made only by **MATTHAI, INGRAM & CO.,**
Factory and Main Office: BALTIMORE, MD. Branch: 64 Reade St., N. Y.
Leading manufacturers of Stamped and Patent Pieced Tin Ware and Galvanized
Iron Ware.

THE Avery Stamping Co.

We retin Iron, Steel and Copper. CLEVELAND, O.

Heavy Blanking, Pressing and Stamping.

Rainey Connellsville Furnace and Foundry Coke.

The only Coke you can buy and know you are getting the best that can be manufactured. All our works in
the heart of the Region, within four miles of Connellsville, Pa.

CAPACITY, 3,000 TONS DAILY.

W. J. RAINEY, MAIN OFFICE: **CLEVELAND, OHIO.**
Mercantile Bank Building.

THE
ANSONIA BRASS
AND **COPPER CO.**
MANUFACTURERS OF
BRASS AND COPPER
Seamless Tubes, Sheets, Rods and Wire.

Ingot Copper.

SOLE MANUFACTURERS

Tobin Bronze

(TRADE-MARK.)

Condenser Plates, Pump Linings, Wire, Round,
Square and Hexagon Bars, for Pump
Piston Rods and Bolt Forgings.

19 & 21 Cliff Street, - - New York.

JOHN DAVOL & SONS,

AGENTS FOR

Brooklyn Brass & Copper Co.,

DEALERS IN

INGOT COPPER, SPELTER, LEAD, TIN,
ANTIMONY, SOLDER & OLD METALS,
100 John Street, - New York.

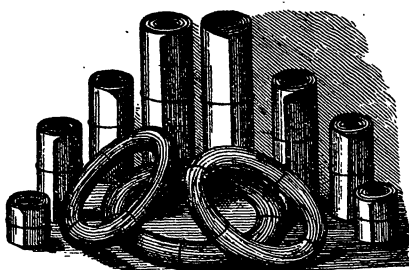
Rome Brass and Copper Mills,

ROME, N. Y.,

— MANUFACTURERS OF —

Roll and Sheet Brass and German Silver.
Brass, Copper and German Silver Wire.
Brass and Copper Rods and Braised Brass Tubing.
Rivets and Burs.
Seamless Brass Ferrules.
Check and Key Tags.
Brasiers and Sheathing Copper.
Copper Bottoms.
Bolts, Circles, &c., &c.

The Phosphates of America. Where and how they occur; how they are mined; and what they cost. With practical treatises on the manufacture of sulphuric acid, acid phosphate, phosphoric acid and concentrated superphosphates, and select methods of chemical analysis. By FRANCIS WYATT, Ph.D. Cloth, profusely illustrated..\$4.00
For sale by David Williams, 98-102 Reade St., N. Y.



Waterbury Brass Co.

Established 1845.

Sheet, Roll and Platers' Brass,
German Silver, Copper, Brass and Ger-
man Silver Wire, Brass and
Copper Tubing,

**COPPER RIVETS AND BURS,
PERCUSSION CAPS,
TAPE MEASURES,
METALLIC EYELETS,**

Brass Kettles, Brass Tags, Powder Flasks,
Shot Pouches, &c.,

AND SMALL BRASS WARES OF EVERY DESCRIPTION.
HICK'S PRIMERS. BERDAN PRIMERS.

*Cartridge Metal in Sheets or
Shells a Specialty.*

Sole Agents for the CAPEWELL MFG. CO.'S
Line of Sporting Goods.

DEPOTS:

296 Broadway, New York. 125 Eddy St., Provi-
dence, R. I.

MILLS AT WATERBURY, CONN.

THE
New Haven Copper Co.,

SOLE MAKERS OF

POLISHED COPPER

Under Patent of T. James, Sept. 12, 1876.

ALSO MANUFACTURERS AND

DEALERS IN

BRAZIERS' & SHEATHING COPPER,

Kettles, Bottoms, Bolts, Circles, &c.,

ALSO MANUFACTURERS OF

Cast Steel Augers and Bits of Superior Quality.

294 Pearl St., NEW YORK.

MATTHIESSEN & HEGELER ZINC CO.,

LA SALLE, ILLINOIS,

SMELTERS OF SPELTER,

AND MANUFACTURERS OF

SHEET ZINC AND SULPHURIC ACID.

Special Sizes of Zinc out to order. Rolled Battery Plates.

Selected Plates for Etchers' and Lithographers' use.

Selected Sheets for Paper and Card Makers' use.

Stove and Washboard Blanks.

ZINCS FOR LECLANCHE BATTERY.

BRASS GOODS MFG. CO.,

Mfrs. of Stamped Brass, Silver and Nickered Goods, Brass Labels for Cans and Rubber Moulds,

BRONZE DOOR KNOBS,

Bronze and Plated Roses, Combined Rose and Escutcheon Plates, Socket Shells, &c., Patent Mirror Pin
Cushion Business Cards, Mucilage Brushes. Novelties of new design made to order.

SALESROOM: 88 Chambers St., New York. FACTORY: 86-92 Third St., So. Brooklyn.

HENDRICKS BROTHERS,

Proprietors of the

Belleville Copper Rolling Mills,

Manufacturers of

**Braziers', Bolt and Sheathing
COPPER.**

COPPER WIRE AND RIVETS.

Importers and Dealers in

Ingot Copper, Block Tin, Spelter, Lead, Antimony, etc
49 CLIFF ST., NEW YORK.

THE PLUME & ATWOOD MFG. CO.

MANUFACTURERS OF

Sheet and Roll Brass

—AND—

WIRE,

GERMAN SILVER AND GILDING METAL,
COPPER RIVETS AND BURS, COP-
PER ELECTRICAL WIRE,

Pins, Brass Butt Hinges, Jack Chain,
Kerosene Burners, Lamp
Trimmings, &c.

18 MURRAY ST., NEW YORK.

71 PEARL ST., BOSTON.

90 MARKET ST., CHICAGO.

ROLLING MILL,
THOMASTON, CONN.

FACTORIES:
WATERBURY, CONN.

Holmes, Booth & Haydens

MANUFACTURERS OF

Sheet, Roll Brass, Brass and
German Silver Wire.

COPPER RIVETS AND BURS

JACK CHAIN.

SEAMLESS TUBING, BRASS AND COPPER.

Braided Brass and Copper Tubing,
Bare and Insulated Wire for Elec-
tric Lighting and Street Rail-
way Use, Lamp Goods and
Kerosene Burners in
great variety.

FACTORIES: 25 Park Place,
Waterbury, Conn. New York.

SCOVILL MFG. COMPANY,

Manufacturers of

BRASS

Sheet, Wire, Tubes.

BUTT HINGES.

BUTTONS,

LAMP GOODS,

NOVELTIES.

PURE ALUMINUM

INGOT and SHEETS.

FACTORIES, WATERBURY, CONN.

DEPOTS:

423 Broome Street, New York.
210 Lake Street, Chicago.
29 High Street, Boston.

WILLIAM S. FEARING.

100 Chambers St., NEW YORK,

SELLS TO THE TRADE

Sheet Brass, Fancy Sheet Brass,
German Silver, Copper, Brass
and German Silver Wire,
Braided and Seamless Brass and
Copper Tubes, Brass and Cop-
per Rods, Brass Ferrules,
Pure Copper Wire,
Sheet and Ingot Copper, Spelter,
Tin, Antimony, Lead, &c.

Rough Casting of Aluminum.

Aluminum Bronze, German Silver Bronze and all
kinds of Metals. Manufacturers of Chandeliers, Metal
Picture Frames, Ink Stands, Figures, Statues, etc.
Stair Carpet Holders a Specialty.

St. Louis Bronze & Aluminum Works,

3741-3743 North Broadway,
ST. LOUIS, MO.

**ELEPHANT
TRADE-MARK.**

ALL GENUINE
INGOTS & MANUFACTURES
BEAR OUR
REG. TRADE MARKS.



"Phosphor Bronze"

PHOSPHOR-BRONZE

INGOTS, CASTINGS, WIRE, SHEET & C.
THE PHOSPHOR BRONZE SMELTING CO. LIMITED
512 ARCH ST. PHILADELPHIA PA. U.S.A.
ORIGINAL MANUFACTURERS OF PHOSPHOR-
BRONZE IN THE UNITED STATES AND SOLE
MAKERS OF "ELEPHANT BRAND" PHOSPHOR-BRONZE.

**PHOSPHOR
BRONZE.**

The Wm. Cramp & Sons S. & E. B. Co., PHILADELPHIA, PENNA.

BRASS FOUNDERS.

YORK AND THOMPSON STS.,

SOLE MANUFACTURERS OF

AMERICAN MANGANESE BRONZE.



MANGANESE BRONZE PROPELLER WHEELS A SPECIALTY.

Our Manganese Bronze is invaluable where Castings of great Tensile Strength are needed. In this quality it is nearer Steel than any other alloy in the market, and in appearance the castings are unequalled.

We Make Larger Castings and More of Them than Any Competitor.

WALDO & STOUT, BRIDGEPORT, CONN.

SOUND CASTINGS IN

ALUMINUM, PHOSPHOR AND MANGANESE BRONZE.

WIRE BARS and PLATES FOR ROLLING MILLS.

BRASS, BRONZE,
COMPOSITION and
ALUMINUM

CASTINGS, Heavy and Light.

F. L. GAYLORD CO.

ANSONIA,
CONN.

Send
for
Prices.

GENUINE PHOSPHOR TIN,

MANUFACTURED BY THE

**CROSBY STEAM GAUGE
AND VALVE CO.**

Boston, Mass., U. S. A.

Branches: NEW YORK, CHICAGO AND LONDON.

DASSAIC ART CASTING CO.

Passaic, N.J.
New York Office
35 WARREN ST.
Fine Castings by new pressure process, equal to hand cut work, in Bronze, Brass, Aluminum and German Silver. Machinery Name Plates 1½ cents per sq. in. Aluminum Bronze Dies, Metal Molds and Mechanical Castings absolutely true to pattern.

THE **CRESCENT** TRY IT!
AND YOU WILL USE NO OTHER

**THE CRESCENT BRAND
PHOSPHOR
TIN.**

THE HIGHEST AND
RICHEST GRADE MADE.

MANUFACTURED ONLY BY
THE CRESCENT PHOSPHORIZED METAL CO.
OFFICE AND WORKS
2107 2109 and 2111 INDIANA AV. PHILADELPHIA, PA.

CROWN SMELTING COMPANY,

Chester, Pa.

Bronze, Brass and Composition Castings.

Inventors and Sole Manufacturers of

"Crown Bronze" Bearing Metal and "Crown ROLLING MILL Babbitt Metal."

Manufacturers of PHOSPHOR-BRONZE TO PENNSYLVANIA RAILROAD.

Specifications in ingot metal or castings.

THE WILMOT & HOBBS MFG. COMPANY

Especially solicit orders for "Soft" and "Extra Soft"
Plain Blue Finish or Annealed or Pickled

**HOT ROLLED BAND, STRIP
AND PLATE STEEL.**

Great accuracy of gauge and width and uniformity of
quality will always be maintained.

Also THE CELEBRATED BRIGHT SURFACE and ANNEALED

COLD ROLLED SHEET AND STRIP STEEL

FOR DIFFICULT PRESSED, STAMPED, DRAWN WORK, & C.



Unexcelled because
of its
Smoothness of Surface,
Accuracy of Gauge,
Great Ductility and Strength,
General Uniformity
and Freedom from Grit.

Furnished in any width
from ½ to 12 inches
and in lengths from
3 inches to 300 Feet.
Also
any degree of stiffness
and quality of surface.

The above illustrates something of the variety of Stamped and Drawn Work which can be made from this Steel.

PRICES GREATLY REDUCED On some Grades and Sizes of C. R. Steel when Bought
in Large Quantities of a Size.

When in a hurry use Long Distance Telephone.
24 hours' ride from Grand Central Depot, N. Y. City, via N. Y., N. H. & H. R. R.

BRIDGEPORT, CONN.

A

PHOSPHOR-TIN

BY USING MY PHOSPHOR TIN MANUFACTURERS CAN MAKE ANY DESIRED GRADE PHOSPHOR BRONZE THEMSELVES. BY THE SIMPLE PROCESS OF MELTING. MUCH CHEAPER THAN THEY ARE NOW TO BE HAD IN THE MARKET. NEW OR OLD COPPER CAN BE USED. FOR CIRCULARS AND PRICE ADDRESS **HALK & NAUMANN** NEW-YORK SOLE AGENTS FOR THE U.S. AND CANADA. PEARL

ALUMINUM!

**THE COWLES ELECTRIC SMELTING &
ALUMINUM COMPANY,**

Lockport, - New York,

Offer Pure Aluminum in Ingots, Slabs, Sheet, Wire and Castings at lowest market rates.

Aluminum Bronze, Aluminum Brass,
Silver Bronze, Silicon Bronze
and Manganese Bronze.

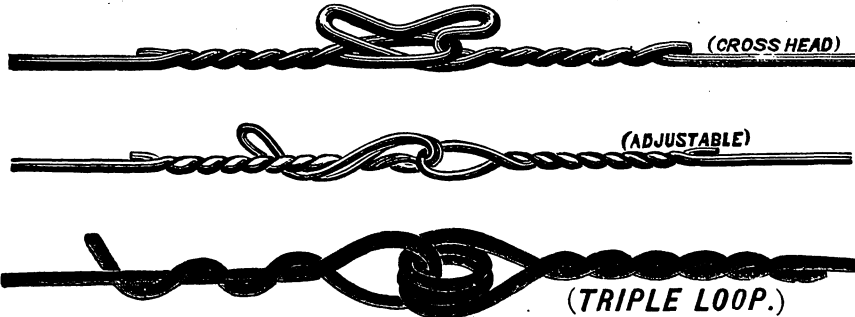
WASHBURN & MOEN MANUFACTURING CO.,

Worcester, Mass. New York City. Chicago. San Francisco. Houston, Texas. Waukegan, Ill.

MAKERS OF IRON, STEEL AND COPPER.

**EVERY VARIETY OF WIRE FOR ALL PURPOSES.
PATENT STEEL WIRE BALE TIES.**

Wire Rope and Cable, Hard and Soft Drawn Copper Wire for Electrical Purposes, Galvanized Iron and Steel Telegraph and Telephone Wire, Glidden Patent Steel Barb Wire, Patch and Clock Main Springs, Eye-glass Springs, Steel Wire for Needles and Drills.



Pump Chain, Two Strand Twisted and Flat Twisted Fence Wire without Barbs, Fence Staples, Stretchers, &c.

Bright, Annealed, Tinned, and Galvanized and Copper Wire, on Spools, 1 oz. to 1 lb.

Send for Price-lists, Circulars and Descriptive Pamphlets.

Warehouses: New York, 16 Cliff St. Chicago, 107 & 109 Lake St. San Francisco, 8 & 10 Pine St. Houston, Texas.

**The American Metal Co.**

(LIMITED),

Levin Building, 80 Wall St., New York.

P. O. BOX 957.

COPPER, COPPER ORES AND MATTES.

TIN, LEAD, SPelter, ANTIMONY, NICKEL, ALUMINUM, BULLION, IRON.

Advances made on Consignments.

AGENTS FOR

Henry R. Merton & Co., - - London.
Metallgesellschaft, Frankfurt-on-Main.
Williams, Foster & Co., Ltd., Swansea.

AMERICAN SPIRAL SPRING CO.,

MANUFACTURERS OF

ALL KINDS OF SPIRAL SPRINGS.

OFFICE AND WORKS: -

Shinglas and Bluff Streets, - PITTSBURGH, PA.

P. O. Box 104.

TELEPHONE 705.

WM. MCFARLAND,
IRON FOUNDER,

TRENTON, - - N. J.

Chilled Cast Wire DIES

A SPECIALTY.

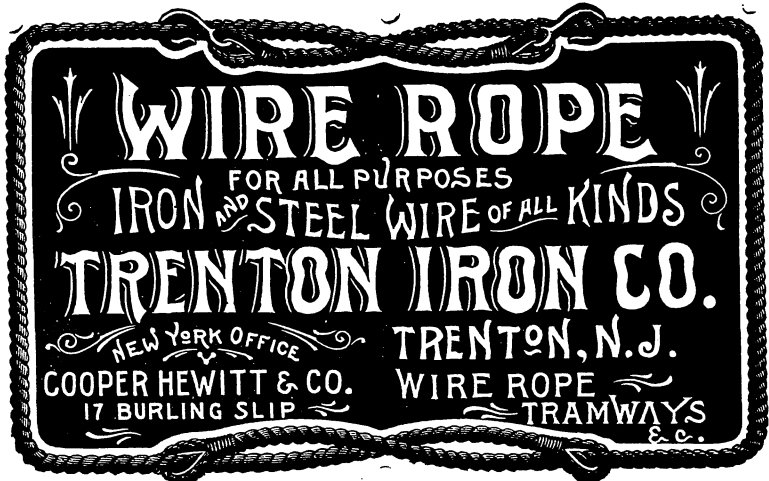
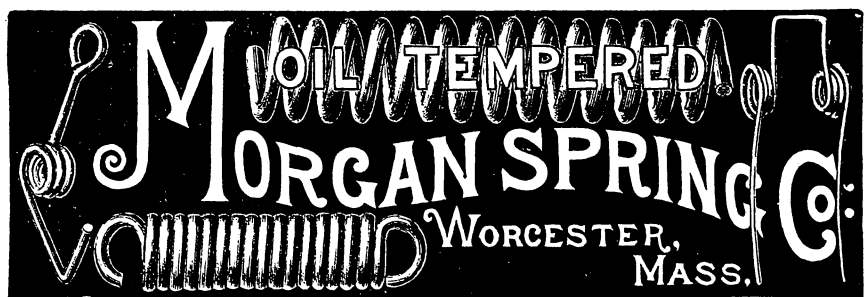
Any Size or Style Made at Short Notice.



Guaranteed.

Best Anti-Friction Metal for all machinery bearings. For high speed and heavy crushing weight it has no equal. Introduced in this country since 1891 and has displaced all Anti-Friction metals it has come in contact with.

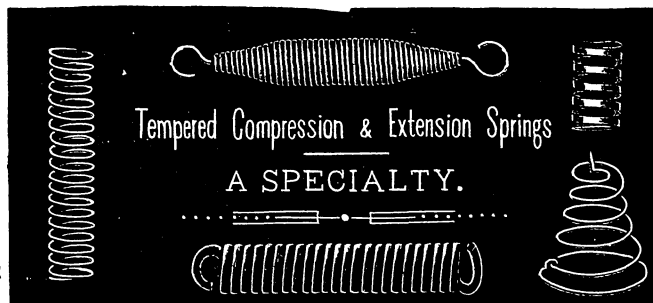
THEODORE HIERTZ & SON, SOLE MFRS.,
Manufacturers Babbitt Metals, Solder, Lead Seals, &c.
30th St., & Park Ave., St. Louis, Mo.

**MILLER & VAN WINKLE.**

MANUFACTURERS OF

STEEL WIRE AND STEEL SPRINGS.

TEMPERED STEEL WIRE.



MACHINERY SPRINGS.

OFFICE AND WORKS: }
18 to 24 Bridge Street, } BROOKLYN, N. Y.

VOLUTE,
WIRE
and
FLAT STEEL

SPRINGS

for Agricultural Implements, Machinery and various other purposes.
Write for prices to
SABIN MACHINE CO.,
MANUFACTURERS.
MONTPELIER, VT.



117th to 118th Street and Harlem River.

General Offices, Foot 118th Street, New York.



Makers of Iron, Bessemer, Siemens-Martin and Crucible Cast Steel Wire of all kinds, annealed, soft and hard drawn; Coppered Spring Wire for Furniture Springs, &c., Coppered Soft Wires, Baling Wires, Suspension Bridge and Rope Wires of all kinds, &c.

STEEL MUSIC WIRES and MUSIC SPRING WIRES,

UNRIVALED FOR PIANOFORTE STRINGS.

FOR THE HIGHEST CLASS OF SPRINGS.

Specialty of finest Cast Steel Wires, round, flat, square and any other shape, tempered and also in the soft state, guaranteed to harden and temper. Solid Rib and Paragon Umbrella Wires. Crinoline, Corset, Shade Roller, Lock, Hat, Brush, Saw, Band Saw, Clock Spring, Clock Bell, Clock Verge and Watch Spring, Rule and Tape Line and Eyeglass Wires, &c. Plane, Needle, Fish Hook, Drill and Hair Spring Wires. Special Cast Steel Wires of any kind made for special purposes. Also Covered Wires—Braided and Cloth and Paper Covered—for crinoline, corset and other purposes. Cold Rolled and Slit soft and Tempered Steel Strips of all kinds and for all purposes.

Special Wires and Springs of Every Description.

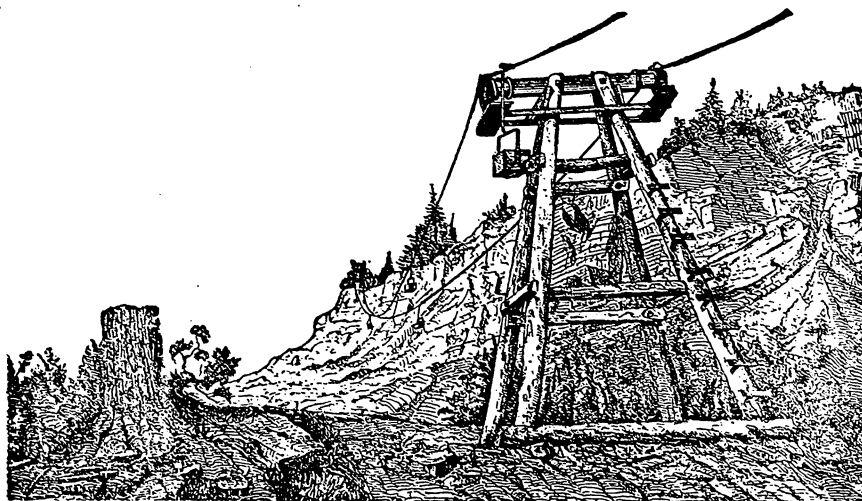
CORRESPONDENCE SOLICITED.

SAMPLES FURNISHED ON APPLICATION.

CALIFORNIA WIRE WORKS,

9 Fremont Street,

San Francisco, Cal.



MANUFACTURERS OF

WIRE ROPE FOR CABLE RAILWAYS AND MINING PURPOSES.

HALLIDIE'S PATENT WIRE ROPEWAY,

Simplest and most economical means of transportation. Send for Illustrated Catalogue.

THE CELEBRATED

"SILVER FINISH"

GALVANIZED POULTRY NETTINGS.

FOR SALE BY THE HARDWARE TRADE.

GET THE BEST.

ESTABLISHED 1880.

LUTHER SHAW & SON,

CHAS. L. SHAW, Proprietor.

BRASS FOUNDERS

[AND MANUFACTURERS OF

BABBITT * METAL

and SOLDER.

All kinds of Brass, Composition and Bronze Castings made to order.

Correspondence Solicited.

WORCESTER, MASS.



DUNBAR BROS.,

Manufacturers of

Clock Springs and Small Springs

of every description, from best Cast Steel,

BRISTOL, CONN.

ELECTRICITY AND MAGNETISM. A short text-book, with 165 explanatory engravings and diagrams. 240 pages, 12mo. By T. DUNMAN. 40 Cents. Sent, prepaid, on receipt of price, by DAVID WILLIAMS. Publisher and Book-seller, 96-102 Reade Street, New York.

**Always
Ask
For**



Unequaled for Strength
and Durability.

Made Only by

Broderick & Bascom Rope Co.,
St. Louis, Mo.

**HOWSON
AND
HOWSON**

Counsellors at Law
Solicitors of Patents

PHILADELPHIA

Forrest Building, 119 S. 4th St.

NEW YORK

Potter Building, 38 Park Row.

WASHINGTON

Atlantic Building, 928 F St.

PATENTS

U. S. and Foreign Secured.

Trade Marks and Copy Rights. Twenty
Years' Experience. Send model or sketch
and brief description of your invention for
Free report as to patentability. Expert
searches and opinions as to Scope, Validity
and Infringement. Patent Causes
Prosecuted and Defended. Practice in
U. S. Supreme, Circuit and Circuit Ap-
peals Courts, and U. S. Patent Office.

Send for "Plain Words about Patents," Free.

PATENT PRACTICE EXCLUSIVELY.

References Furnished on Application.

E. B. STOCKING, Attorney at Law,
611 F ST., N. W., WASHINGTON, D. C.

PATENTS

\$40,000,000

Earned by Bell Telephone Patent in 1891. Pro-
tect your invention by PATENT. No charge
for examination to determine patentability.
Send model and description. NEW BOOK FREE.
S. C. FITZGERALD, Washington, D. C.

H. E. PAINE.
Ex Com'r of Patents.

S. B. LADD,
Mechanical Engineer.

**PAINE & LADD,
PATENT LAWYERS
AND SOLICITORS.**

Loan and Trust Bldg., Washington, D. C.

Examinations and Reports on the Validity,
Scope and Infringement of Patents. Practice in
the U. S. Circuit, Circuit Appeals and Supreme
Courts. U. S. and Foreign Patents.

PATENTS.

H. W. T. JENNER, Patent Attorney and Me-
chanical Expert. 519 Seventh St., Washington,
D. C. Charges moderate. Write for terms.
Established 1883.

BARBED

WIRE.

INDIANA WIRE FENCE CO.,

Crawfordsville, Ind.

A. LESCHEN & SONS' ROPE CO.,

MANUFACTURERS OF



ST. LOUIS, MO.

CORRESPONDENCE INVITED.



Williamsport Wire Rope Co., Williamsport, Pa.



WAREHOUSES: 87 Liberty St., New York. WORKS
Wilkesbarre, Pa.

Springs.



Springs.

Haley Manufacturing Co., Concord, N. H.

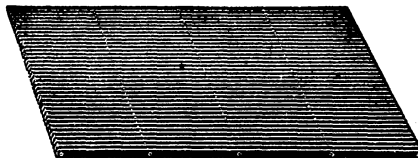
**CLOCK SPRINGS,
BAND SAW STEEL,
STEEL WIRE,**

Round, Flat, Tempered and
ready for Tempering, Curtain,
Needle, Spring Scale, Sash Bal-
ance and Lock Wire. Flat
Coiled Springs for Lamps,
Sleeping Cars, Toy Movements
and all other purposes.

CORRESPONDENCE SOLICITED.

ARE YOU FAMILIAR WITH

Built
for
Service.



The Elastic
Steel
Door Mat?

REVERSIBLE.

SELF-CLEANING.

HANDSOME.

THE WIRE GOODS COMPANY, - Worcester, Mass.

NEW HAVEN WIRE MFG. CO.,

Manufacturers of

WIRE

in great variety.

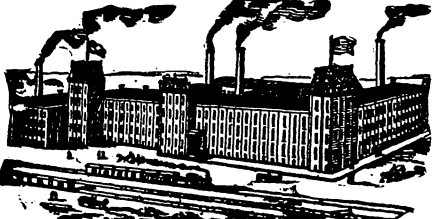
NEW HAVEN.

CONN.

HOWARD & MORSE
45 FULTON ST,
NEW YORK.
HEAVY MINING
COPPER,
BRASS,
STEEL
OR IRON
WIRE CLOTH.

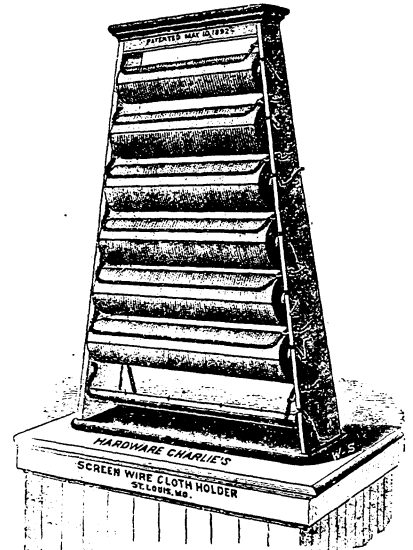
ALSO
 MANUFACTURERS OF
GENERAL
WIRE WORK.
 Window Guards,
 Stable Fixtures,
 RAILINGS,
 Sand Screens
 Coal Screens
 Etc.

WICKWIRE BROTHERS, **CORTLAND, N. Y.**
 MANUFACTURERS OF
Wire Cloth and Wire Goods,

 Coal Sieves,
 Flour Sieves,
 Corn Poppers,
 Dish Covers,
 Metallic
 Coal Sieves.

NEW PROCESS
Cortland
POWER LOOM
WIRE CLOTH.
 Every roll wrapped in Pink Paper
 and has our name on label.

HARDWARE CHARLIE'S
SCREEN WIRE CLOTH HOLDER,
 —Manufactured by—
FACH & HOTTES, - MASCOUTAH, ILL.



Patented May 10th, 1892.

This holder carries seven rolls of Wire Cloth, sizes as follows, viz.: 24, 26, 28, 30, 32, 34 and 36 inches wide, can be placed on and fastened on top of counter or on the floor, and is 10 inches wide at the base. The wooden roller (as shown in cut) is pushed through center opening of the roll of Wire Cloth, and the cloth does not require re-rolling to be put on roller, and is easily unrolled by pulling cloth. Rolls of Wire Cloth in lengths of 50 or 100 feet can be placed on the rollers, and the cloth is kept in solid-roll-shape by the wrought-iron tension-rod in front of each roll. The Holder is made in a durable manner, nicely finished, and increases the sale of Wire Cloth by the attractive manner in which the cloth is displayed.

The first year's sales were beyond expectation, and numerous letters of testimonials of general satisfaction have been received from parties now using these Holders.

It is intended for use in Retail Hardware Stores, and for simplicity, adaptability and cheapness in price, as well as for the small amount of room it occupies, cannot fail to commend itself as practical.

Each one is securely packed in a rack, ready for shipment. Weight, 35 pounds. For sale by

THE WHOLESALE HARDWARE TRADE.

KILMER MFG. CO.,
NEWBURGH, N. Y.,

MANUFACTURERS OF

STEEL WIRE RODS,
BALE TIES, BARB WIRE.

BEST QUALITY

Fence Wire Staples, Galvanized Wire Ornamental Fencing,

Cable Wire, Grape Wire, Hop Yard Wire, Coiled Steel Wire, Fence Wire, &c.

Our New Empire Bale Tie.

BRANCH HOUSE: 543-545 State Street, Chicago, Ill.

Address all export communications to

J. W. D. MEIGHAN, 111 Water Street, New York City.

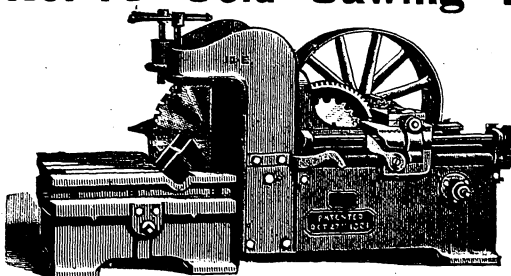
Bryant No. 10 Cold Sawing Machine.

Saves

Time,
 Power,
 Temper,
 Labor.

Gives

True,
 Clean,
 Rapid
 Work.



SEND FOR CATALOGUE.

Cuts

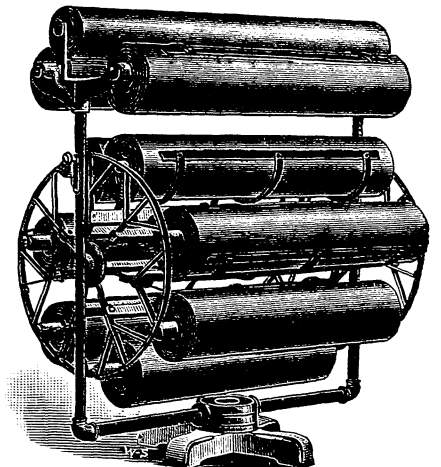
Noiselessly,
 Keenly,
 Easily,
 Inexpensively.

For

General
 Bridge and
 Railway
 Work.

THE Q & C COMPANY, 702-707 Phoenix Bldg., - CHICAGO, ILL.

Screen Wire Holder.



Improvement is the order of the age. Iron and steel are now taking the place of wood in the construction of almost every article of necessity. We call attention to the fact that **Our Screen Wire Holder** is now made almost entirely of Iron and Steel. The upright frame is of wrought iron pipe and the wheels are of steel. It has been greatly improved, so that no live hardware man can well get along without it. Write for circulars. Address,

Hamilton-Rankin Hardware Co.,
 ARKANSAS CITY KANSAS.

PATENTS.

PATENTS obtained in all countries. All business relating to Patents prosecuted with care and diligence. As Examiner and Solicitor, twenty-five years' familiarity with **STOVES AND FURNACES, DRIERS, VENTILATORS** and kindred subjects.

J. A. ASHLEY,

700 Ninth St.

Washington, D. C.

Manufactured by



TRADE MARK

Day Metal Co.
St. Louis, Mo.

IS IT A HOT BOX AGAIN?

Our Gold Leaf Babbitt Metal is especially adapted for use with high speed and heavy machinery and shafting; in fact, in every place where a Babbitt Metal is required. It is sold under the highest guarantee, and has made a remarkable record with all who have used it. A trial of this metal will demonstrate the truthfulness of our claim. Order a sample lot. 50 lb. in Box, 25c. per lb.

DAY METAL CO., ST. LOUIS, MO.

CHAMPION IRON COMPANY.



The largest Iron Fence and Railing Works in the U. S.
KENTON, OHIO.

W. S. ESTEY,

No. 65 FULTON ST., NEW YORK,

MANUFACTURER OF

WIRE CLOTH

—AND—

WIRE WORK

Of Brass, Copper, Iron, Galvanized and Steel Wire of all meshes and grades. For mining, Milling and all other purposes. Locomotive Spark Wire Cloth, &c. For Bank, Office and Counter Railing, Store Fronts, Window Guards, &c.

Galvanized Twist Netting.

Oliver's Patent Decoy Rat Traps.

S T Pat. Adjustable Foundry Riddles.

S T Sand Screens.

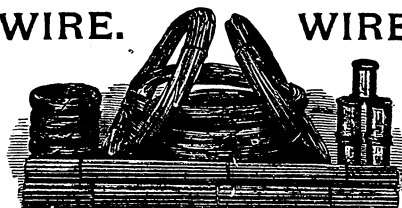
SEND FOR CATALOGUE.

GEO. W. PRENTISS & CO

HOLYOKE, MASS.,

—MANUFACTURERS OF—

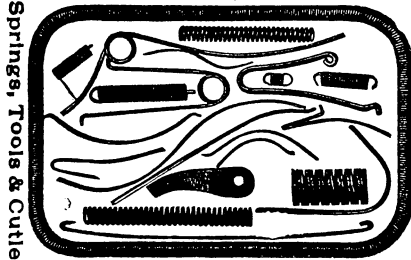
WIRE. WIRE



Bright, Coppered, Annealed and Tin Plated.
Finished to order, round, square, oval or flat.

TINNED WIRE OF ALL SIZES A SPECIALTY

TUCK M'F'G CO., Brockton Mass.

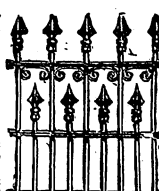


Tempered Springs of all kinds.

Steel and Iron.

Comprising the practice and theory of the several methods pursued in their manufacture and of their treatment in the rolling mill, the forge and the foundry. By W. H. GREENWOOD. \$2.00. Sent, postpaid, on receipt of price, by DAVID WILLIAMS, Bookseller and Publisher 96-102 Reade Street, New York.

IRON FENCING.



WIRE and IRON WORKS.

Illustrated Catalogue Free.

Window Guards. Cresting. Balcony Railing. Grilles. Stable Fixtures, BUILDERS' WIRE AND IRON WORK, Office and Bank Railing, NETTING AND WIRE CLOTH, Columns, Iron Stairs, Jail Cells.

E. T. BARNUM, :: DETROIT, Mich.



WEATHER VANE.

☞ Mention this Paper.

THE VAN DORN IRON WORKS CO., Cleveland, Ohio.



Office and Salesroom, 157 1/2 Euclid Ave.,

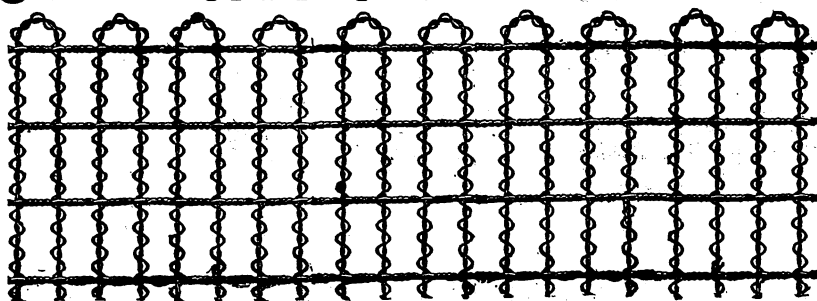
MANUFACTURERS OF

WROUGHT IRON FENCE AND RAILING.

Stable Fixtures, Crestings, Terminals, Wire Office and Counter Railing, Lawn Seats and Vases.

Iron and Steel Jail Cell Work. Ornamental and Structural Ironwork.

STEEL WEB PICKET FENCING.



MOST POPULAR FOR YARDS, LAWNS, PARKS, ETC.

Write for Circular of above, and Steel Wire Fence Board.

DEKALB FENCE CO., - - DeKalb, Ill.

AGENCIES: Eastern—HICKS & DICKEY, Philadelphia, Pa. Southern—W. B. BELKNAP & CO., Louisville, Ky. Western—WYETH HARDWARE & MFG. CO., St. Joseph, Mo. Indiana and Michigan—INDIANA WIRE FENCE CO., Crawfordsville, Ind. Texas—G. K. MERIWETHER, Dallas.

Wire Cloth AND Wire Goods

Hardware Grade and Fanning Mill Wire Cloth, Poultry Netting, Heavy Window Screen Wire Cloth, Coal and Sand Screens, Riddles, Ash Sieves, &c., &c.



Office and Counter Railings, Elevator Enclosures, Wire Stall Guards, Hay Racks Feed Boxes, Window Guards, &c., &c.

BUFFALO, N. Y.

SECURITY WAREHOUSE, EAST ST. LOUIS, ILL.,

Do a general storage business. Rates reasonable. Insurance low.

Located on B. & O. and Pennsylvania Lines.

Direct connection with 26 Railroads entering St. Louis or East St. Louis, and all Ohio, Missouri and Mississippi River Lines.

St. Louis Rates of freight to all points West of Mississippi River. To points East less.

In addition to storage we do a general distributing business on commission. We have representatives traveling all over the West and South.

Correspond with us.

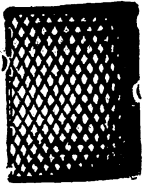


Reliance Wire Works Co., Milwaukee, Wis.

ARCHITECTURAL WIRE AND IRON WORKERS.

Wire Cloth, Galvanized Fencing and Netting, Wire Lath, Wire and Iron Fences and Railings, Window Guards, Stable Fixtures, Bank and Office Railings, all kinds of Brass, Wire and Iron Work for Buildings and Offices.

SEND FOR ILLUSTRATED CATALOGUE.



CLINTON WIRE CLOTH CO.,

— Manufacturers of Every Description of —

WIRE CLOTH, HEX. NETTINGS, WIRE LATH AND FENCING.

Perforated Metals. GALVANIZERS AND TINNERS OF Wire Cloth and Nettings.

Clinton "Standard" (Number 33 Wire) Painted Window Screen Wire Cloth.

FACTORY AND GENERAL OFFICE: CLINTON, MASS.

NEW YORK, 76 Beekman Street.

BOSTON, 199 Washington Street.

CHICAGO, 137 Lake Street

The Gilbert & Bennett Mfg. Co.

— MANUFACTURE —

Pearl Window Screen Wire Cloth.
Galvanized Steel Wire Cloth.
Galvanized Wire Poultry Netting.
"Cottage" Lawn & Garden Fencing.
The World's Web Wire Fencing.
Sieves, Riddles, Screens.
Gilbert's Rival Ash Sifters.
House Furnishing Wire Goods.

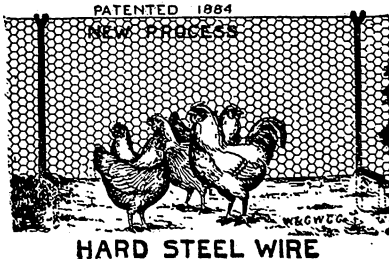
**WIRE CLOTH, NETTING,
Wire Goods, Wire Work**

RAILINGS, WINDOW GUARDS.
WIRE LATHING WITH HAMMOND'S METAL FURRING.

42 and 44 Cliff Street,
NEW YORK.
148 Lake Street,
CHICAGO.

Factories, { GEORGETOWN, CONN.
CHICAGO, ILLINOIS.
ESTABLISHED 1818.

WRIGHT & COLTON WIRE CLOTH CO., Worcester, Mass.



NEW PROCESS
HARD STEEL WIRE CLOTH AND NETTING
GALVANIZED
WIRE NETTING.

Patented March, 1884.
Patents Pending.

Painted Window Screen Wire Cloth,
WIRE LATHING, HOUSE FURNISHING WIRE GOODS.

SEND FOR LATEST CATALOGUE.

Pennsylvania Wire Works, 233 & 235 Arch St., Philadelphia, EDWARD DARBY & SONS.

SUMMER	==	We R the People.	==	GOODS.
ADJUSTABLE WINDOW SCREENS,		"PENNSYLVANIA"		SCREEN DOORS
"PENNSYLVANIA,"		GALVANIZED POULTRY NETTING,		"DARBY" and "SPECIAL"
"STANDARD,"		"CORTLAND"		—ALSO—
"EXCELSIOR,"		WINDOW SCREEN		Door - and - Window - Sticks
"ELECTRIC,"		WIRE CLOTH.		—AND—
"ROBERTS."				CORNER BRACKETS.

SPRING HINGES—DOOR PULLS. Write for Prices.

PAINTED AND GALVANIZED WINDOW SCREEN CLOTH.

IRON, STEEL, BRASS AND COPPER WIRE CLOTH.

MANUFACTURERS
**THE ROEBLING
STANDARD
WIRE
LATHING.**

• **NEW JERSEY** •
WIRE CLOTH CO.

**"JERSEY"
POULTRY
NETTING
AND FARM
FENCING.**

TRENTON,
NEW JERSEY.

117 AND 119 LIBERTY STREET,
NEW YORK.

171 AND 173 LAKE STREET,
CHICAGO.

25 AND 27 FREMONT STREET,
SAN FRANCISCO.

STEEL, IRON, COPPER, ZINC, BRASS AND TIN PERFORATED.

—FOR—

Grain Cleaning Machinery;
Woolen, Cotton, Paper Pulp, Rice,
Flour and Oil Mills;
Distilleries, Sugar and Malt Houses;
Gas, Water, Brick and Tile Works, Filters,
Ventilators, &c;
Oil, Gas and Vapor Stoves, Lanterns, Lamps, etc.

Perforated Filter Press Plates

For Paraffine Wax, Cotton-Seed Oil, Sugar and other purposes.



THE HARRINGTON & KING PERF. CO.,
Main Office and Works, 224 to 240 Union Street,
Eastern office, No. 284 Pearl St., New York. **CHICAGO, ILL., U. S. A.**

Screen Plates for Coal, Coke, and Ore Separators, Jigs, Trommels, Washers and Sizers.

Heavy Steel and Iron Plates and Cylinders for Coal and Coke Breakers, Ore, Stone, Phosphates & Gravel Screens.

For Railroads, Locomotive and Car Builders.

Prices and Samples on Application.

ALUMINUM or MANGANESE BRONZE
SCREEN PLATES
TO WITHSTAND ACTION OF ACIDULATED WATERS
WITH
Hardness and Life of Best Steel.

PERFECTION BRONZE CASTINGS,

BABBITT'S METALS,

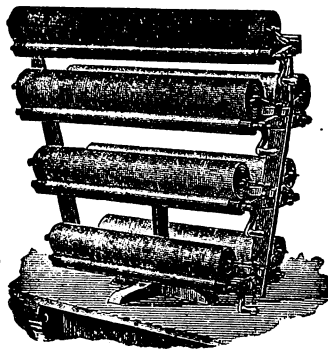
Wire and Wire Cloth

OF EVERY DESCRIPTION.

EASTWOOD WIRE MFG. CO.

Belleville, New Jersey, U. S. A.

AM. SCREEN WIRE HOLDER.
Patented April 17, 1888, is manufactured by



JOHN HOSFORD,
Monroeville, Ohio.

Arranged to hold seven rolls of Wire of different widths; no trouble to load the Holder with Wire.
Send for descriptive circulars and testimonials.
FOR SALE BY THE JOBBING TRADE.

OXFORD IRON AND NAIL CO., Cut Nails AND SPIKES.

J. S. SCRANTON, Sales Agent,
81, 83 and 85 Washington Street,
NEW YORK.

EDITION FOR 1892

DIRECTORY

— OF THE —

Iron and Steel Works

OF THE UNITED STATES.

Embracing a complete list of the Blast Furnaces, Rolling Mills, Steel Works, Forges and Bloomaries in every State and Territory; also Wire Mills, Wire Nail Works, Car Axle Works, Car Wheel Works, Car Builders, Locomotive Works and Cast Iron Pipe Works and Wrought Iron Pipe Works. 11th edition, revised, cloth.

PRICE, - - - \$4.00.


Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher & Bookseller

98-102 Reade Street New York.

CONSOLIDATED STEEL AND WIRE CO.

GENERAL OFFICES, THE ROOKERY, CHICAGO, ILL.

Branch  Offices.
 ST. LOUIS, MO., 1935 Papin Street.
 PITTSBURGH, PA., Westinghouse Building.
 NEW YORK CITY, N. Y., Havemeyer Building.
 SAN FRANCISCO, CAL., 81 Crocker Building.

BARBED WIRE.

WIRE RODS and PLAIN WIRE of Every Description.

WIRE NAILS.

Bale Ties, Fence Staples, etc.

MILLS LOCATED AT

ST. LOUIS, MO. PITTSBURGH, PA. ALLENTOWN, PA.
 JOLIET, ILL. LOCKPORT, ILL.

LOW PRICES

For every kind of fancy or staple wire goods, for interior or exterior use.

Send for Prices and Catalogue "B."

LANGE FENCE and WIRE CO., - - St. Louis, Mo.

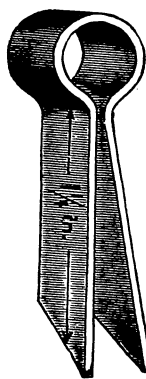


E. JENCKES MFG. CO.,

PAWTUCKET, R. I.

**Bright Wire Goods,
 Spring Cotters and Keys,
 Crescent Wire Coat
 and Hat Hooks.
 Belt Hooks, &c.**

Bent Wire Work
 A Specialty.



THE IRON FOUNDER.

A COMPREHENSIVE TREATISE ON
 The Art of Molding.

INCLUDING CHAPTERS ON

Core-making; Loam, Dry Sand and Green Sand Molding; also Crystallization, Shrinkage and Contraction of Cast Iron, and a full explanation of the science of Pressures in Molds; added to which are Formulas for Mixtures of Iron, Tables, Rules and Miscellaneous Information.

BY

SIMPSON BOLLAND,

Practical Molder and Manager
 of Foundries.

Illustrated with Over Three Hundred Engravings.
 12mo. Cloth, \$2.50

Sent, postpaid, on receipt of price by

DAVID WILLIAMS,

PUBLISHER AND BOOKSELLER

96-1 1/2 Reade Street, New York.

HAVE BEEN IMITATED BUT NEVER EQUALED—THEY ARE BEYOND COMPARISON

We make
 90 per cent.
 Of the
 Wire Mats
 Sold in
 America.



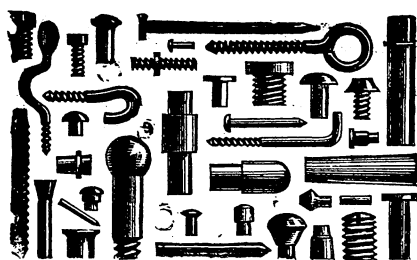
Why?
 Because
 They are
 Odorless,
 Everlasting
 and "Best."

See that your mat has brass tag attached stamped "HARTMAN."

HARTMAN MFG. COMPANY, Works, BEAVER FALLS, Pa.

Branches: 102 Chambers St., New York; 73 S. Forsyth St., Atlanta. T. D. GANSE, Gen'l Western Sales Agent, 508 State St., Chicago, Ill.

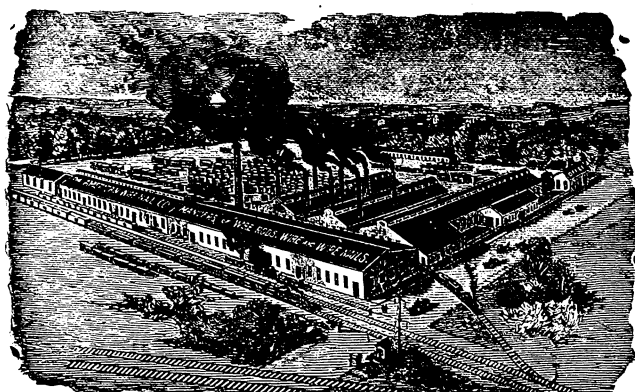
Write for our Testimonial Booklet and Illustrated Catalogue—Mailed Free.



IRON AND BRASS RIVETS, STUDS, PINS, SCREWS, &c.,

For Manufacturers of Light Hardware.

BLAKE & JOHNSON, WATERBURY, CONN.



**The American Wire Nail Co.,
ANDERSON, IND.**

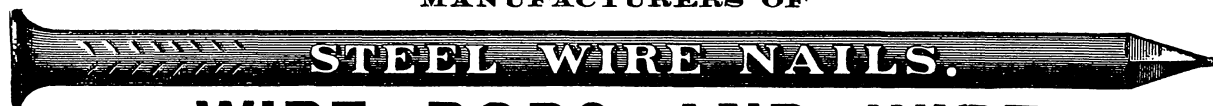
STEEL
ROD
GALVANIZED
PLAIN
FENCE
ALL KINDS
WIRE NAILS.

WIRE

OLIVER WADE, Agt., 18 Broadway, New York.

NEW CASTLE WIRE NAIL CO.,

MANUFACTURERS OF



STEEL WIRE NAILS.

WIRE RODS AND WIRE.

Office and Works,

NEW CASTLE, PA.

E. PHILLIPS & SONS
SOUTH HANOVER, MASS.

TACKS

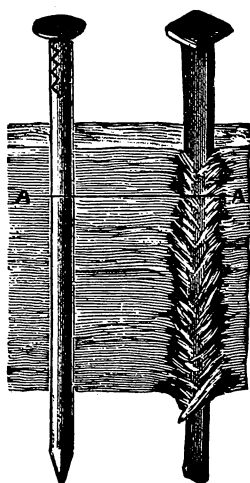
F. R. EMMONS & BRO
21 WARREN ST., NEW YORK.



FRANKLIN S. MILES,
Manufacturer of
Brass, Iron, Steel and German Silver

SCREWS,

206 Quarry St., Philadelphia.



THE SALEM WIRE NAIL CO.

MANUFACTURERS

WIRE NAILS,

Works: SALEM, O.; FINDLAY, O.

General Office: - SALEM, OHIO.

BRANCH OFFICES:

54 Warren St., New York. 415 Phenix Bldg., Chicago.

200 Amer. Central Bld'g, St. Louis.

19-20 Ainsworth Block, Portland, Ore.

THE BAACKES WIRE NAIL COMPANY.

CLEVELAND, O.

Steel Wire Nails, Standards Only.

Wire Rods.

Plain Wire,

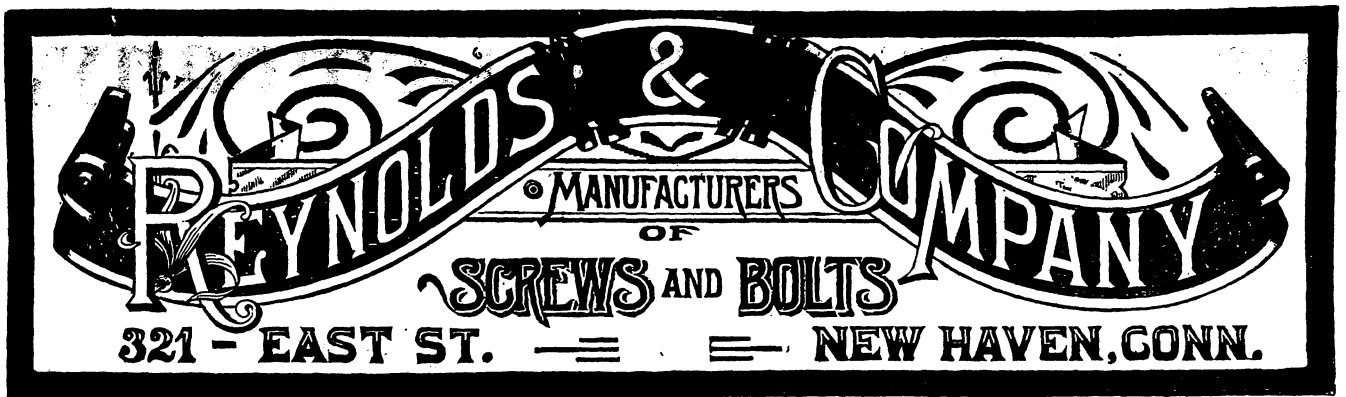
Galvanized Wire.

Barbed Wire,

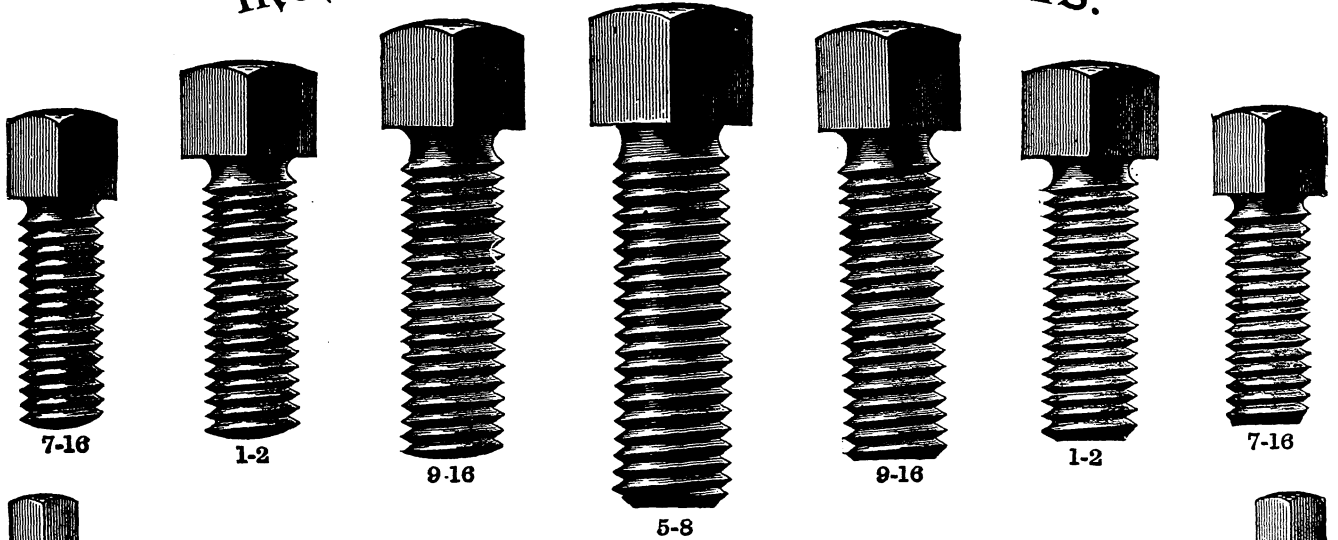
Fence Staples.



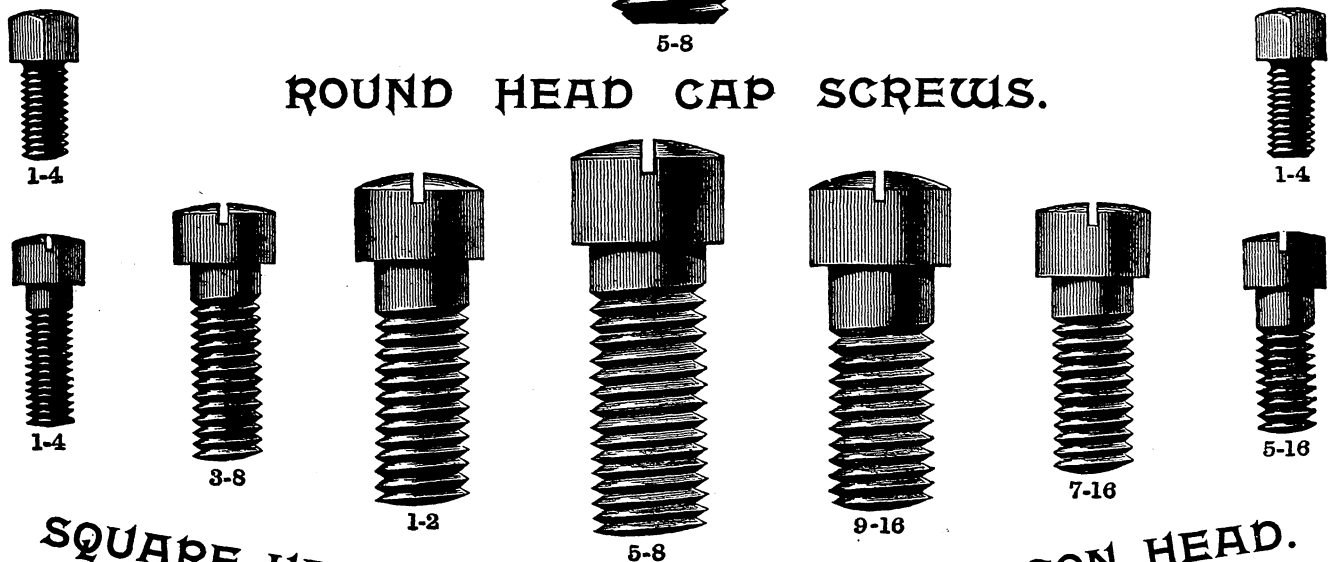
Voltic Electricity. By T. F. Treglohan. 40 cents. For sale by **DAVID WILLIAMS, Publisher** and Bookseller, 96-108 Reade St., New York.



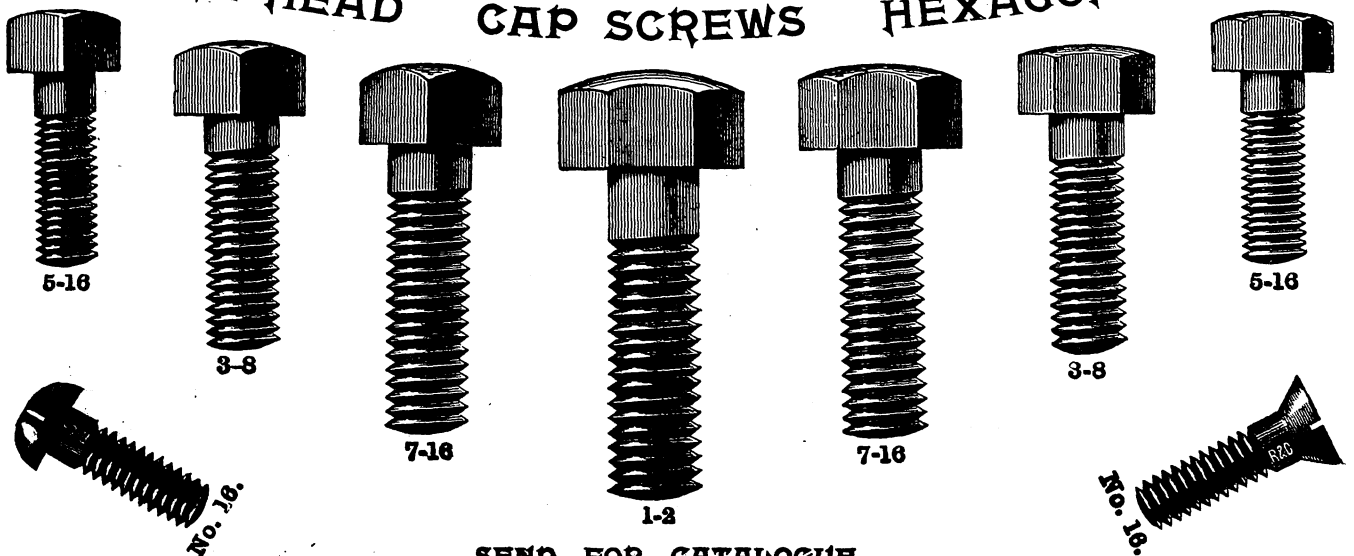
IRON AND STEEL SET SCREWS.



ROUND HEAD CAP SCREWS.



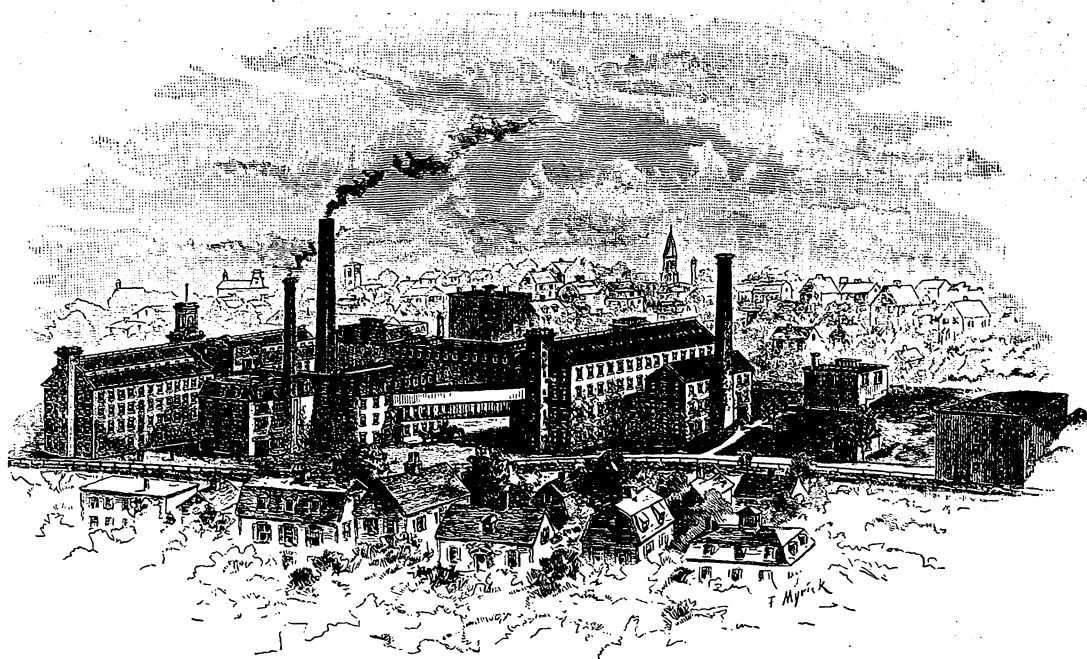
SQUARE HEAD CAP SCREWS HEXAGON HEAD.



SEND FOR CATALOGUE.

American Screw Company,

PROVIDENCE, R. I.



EAGLE MILLS, PROVIDENCE, RHODE ISLAND, U. S. A.

MANUFACTURERS OF

WOOD SCREWS,

In Iron, Brass, Bronze and all Varieties
of Finish.

COACH SCREWS,

MACHINE SCREWS,

RAILROAD SCREWS,

HAND RAIL SCREWS,

SIDE KNOB SCREWS,

LOCK CAP SCREWS,

DOWEL SCREWS,

CHANDELIER SCREWS,

RIVETS, BURS,

TIRE BOLTS,

STOVE BOLTS,

SLEIGH SHOE BOLTS,

SINK BOLTS,

STOVE RODS,

POINTED WIRES,

TAPPED NUTS,

WIRE NAILS,

DOWEL PINS,

TAPS FOR MACHINE SCREWS,

TAPS FOR STOVE BOLTS.

**COLD
FORGED**

Rogers Drive Screws,
Side Knob Screws,
Lock Cap Screws,
Machine Screws,
Stove Bolts,
Spur Pointed Screws,
Threaded Wires,
Fluted Tire Bolts.

American Screw Company,

PROVIDENCE, R. I.

Chicago Store, No. 19 Lake St.

EUROPEAN AGENTS, THOMAS & STIRLING, Liverpool.



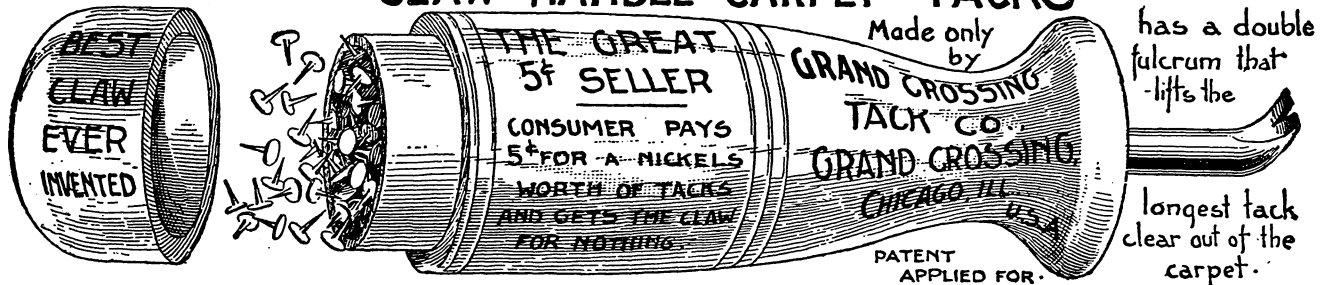
TRUNK,
CLOUT,
FINISHING,
HOOP,
BARREL,
3d FINE,

NAILS

Quality guaranteed. Prices quoted on application.

THE NATIONAL SCREW & TACK CO., - CLEVELAND, OHIO.

FULL SIZE CUT OF CLAW HANDLE CARPET TACKS -



WE ALSO MANUFACTURE

Tacks, Small Nails, Wire Nails, Wire Brads, Staples, Lining and Saddle Nails, Roofing and Slating Nails, Gilt Nails (Parisian Brand), Cut Tacks in little kegs (Bonnie Blue Brand), Bill Nye Brad Boxes, Wood Kegs, Carpet Tacks, and the

GREAT 5c. SELLER.

FOUNDERS
IN BRASS AND COM-
POSITION, HEAVY
AND LIGHT CAST-
INGS.

P. P. EMORY MFG. CO.

— ESTABLISHED 1850. —

SPRINGFIELD, MASS.

Good Work, Fair Prices.

CORRESPONDENCE SOLICITED.

COPPERSMITHS,
and Manufacturers of
COPPER AIR CHAMBERS,
EXPANSION PIPES
AND COILS.

ELECTRICITY

IN THEORY AND PRACTICE,

— OR THE —

ELEMENTS OF ELECTRICAL ENGINEERING.

By LIEUT. BRADLEY A. FISKE, U. S. N.

270 8vo PAGES. 180 ILLUSTRATIONS.

\$2.50 — PRICE — \$2.50

This Book commends itself to Electricians and the Students of Electricity, because it aims to form a bridge between the many works written on the theory of electricity and the many works written on its practical applications.

TABLE OF CONTENTS:

CHAPTER.

- I. MAGNETISM.
- II. FRICTIONAL ELECTRICITY.
- III. WORK AND POTENTIAL.
- IV. VOLTAIC BATTERIES.
- V. LAWS OF CURRENTS.
- VI. SECONDARY or STORAGE BATTERIES.
- VII. THERMO-ELECTRIC BATTERIES.
- VIII. ELECTRO-MAGNETISM.
- IX. INDUCTION-CURRENTS.

CHAPTER.

- X. ELECTRICAL MEASUREMENTS.
- XI. TELEGRAPHY.
- XII. THE TELEPHONE.
- XIII. ELECTRIC LIGHT.
- XIV. ELECTRIC MACHINES.
- XV. ELECTRO MOTORS.
- XVI. ELECTRIC DISTRIBUTION of POWER.
- XVII. METERS.
- XVIII. ELECTRIC RAILWAYS.

Sent, post-paid, on receipt price by

David Williams, Publisher and Bookseller

96-102 Reade Street, New York.

E. H. TITCHENER & CO.
(Late Bing, Wire Goods Co.)
BINGHAMTON, N. Y., U. S. A.
— MANUFACTURERS OF —



STAPLES in All Varieties,
Double-Pointed Tacks, Etc.
Blind Staples a Specialty.

COBB & DREW,
PLYMOUTH, MASS.

Manufacturers of Norway Iron Rivets, Brass and Copper Rivets, Burrs, Washers, D. P. Tacks and Staples.

New York Agency, James S. Henderson, successor to Disosway & Henderson, Hardware.
Agents for Philadelphia Star Carriage and Tire Bolts.

Established 1830.

THE PLYMOUTH MILLS.
Rivets, Trunk Nails,
Tacks, Clout Nails,
Burrs, Wire Nails.
PLYMOUTH, MASS.

ATLAS TACK CORPORATION.**508 SEARS BUILDING, BOSTON, MASS., U. S. A.**

BRANCHES: { **DUNBAR, HOBART & CO., WHITMAN, MASS.**
ESTABLISHED IN 1810.
A. FIELD & SONS, TAUNTON, MASS.
ESTABLISHED IN 1827.
AMERICAN TACK CO., FAIRHAVEN, MASS.
ESTABLISHED IN 1867.

LORING & PARKS, PLYMOUTH, MASS.

ESTABLISHED IN 1842.

TAUNTON TACK CO., TAUNTON, MASS.

ESTABLISHED IN 1854.

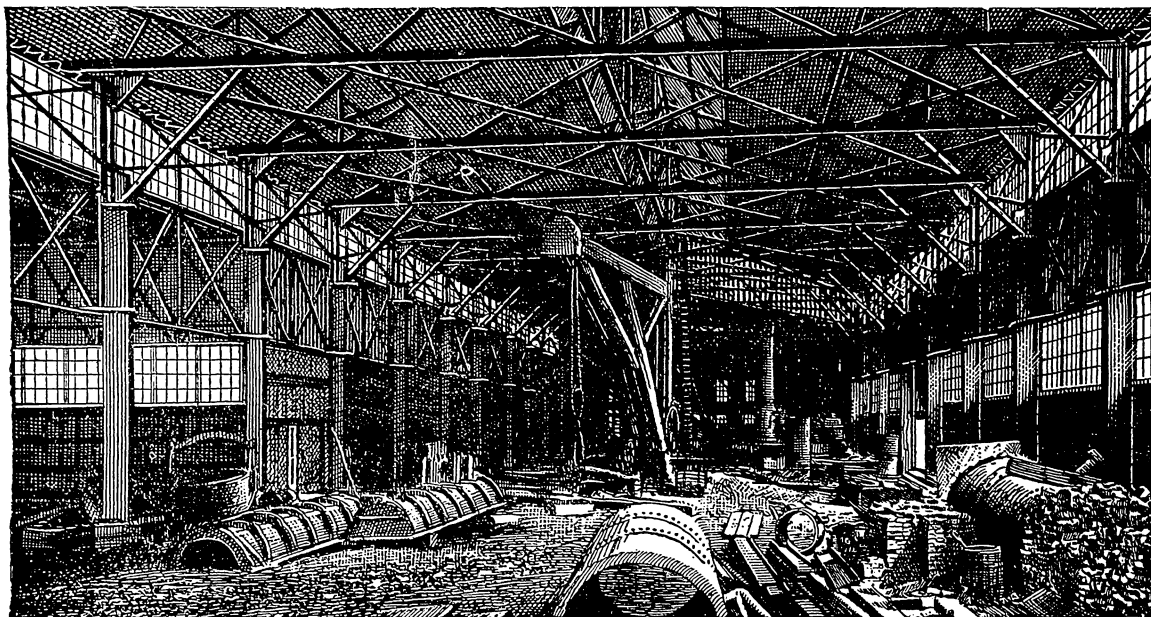
OLD COLONY RIVET CO., PLYMOUTH, MASS.

ESTABLISHED IN 1866.

MANUFACTURERS OF

Tacks, Brads, Small Nails, Shoe Nails, Lining and Saddle Nails, Tufting Nails and Buttons, Wire Nails, Finishing Nails, Patent Brads, Hungarian Nails, Steel Shanks for Boots and Shoes, Wire Tacks, Escutcheon Pins, Eyelets, Glaziers' Points, Rivets, Burrs, Furniture Springs, Pilgrim Spring Bed, and other articles.

We have the largest and only complete and fully assorted stock in the world. Our manufacturing facilities are unequalled. The foregoing well known brands we continue to use, and either will be furnished upon request. We have long distance telephone connection with our New York store and our factories.

MAIN OFFICE, 508 SEARS BUILDING, 199 WASHINGTON ST., BOSTON, MASS.**BRANCH OFFICE & WAREHOUSE, 116 CHAMBERS ST., NEW YORK.****BRANCH OFFICE & WAREHOUSE, 239 & 241 LAKE ST., CHICAGO, ILL.****BRANCH OFFICE & WAREHOUSE, 408 MARKET ST., SAN FRANCISCO, CAL.****BRANCH OFFICE & WAREHOUSE, 406 COMMERCE ST., PHILADELPHIA, PA.**

*Iron Buildings and Roofs for Machine Shops,
Foundries, Power Houses, Car Sheds, etc.*

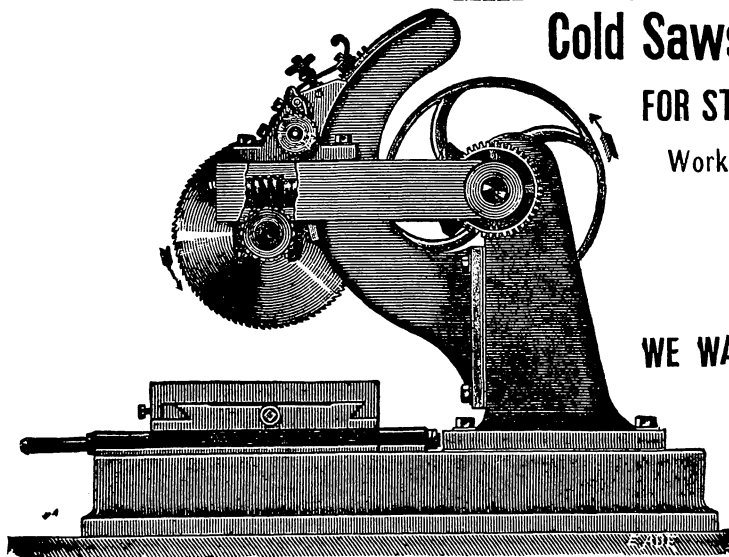
Foundry built by us for TOTTEN & HOGG, Pittsburgh, Pa.

WROUGHT IRON BRIDGE CO.

Communicate with nearest office.

CANTON, OHIO.**NEW YORK CITY.****CHICAGO, ILL.****KANSAS CITY, MO.****GUSTAVE EHRHARDT & SONS,****MANUFACTURERS OF****Cold Saws and Cold Sawing Machines****FOR STEEL, IRON AND OTHER METALS A SPECIALTY.**

Works at Homewood Station, Pennsylvania Railroad,

PITTSBURGH, PA.**WE WARRANT**

Perfect workmanship.
Wear and cost of operating reduced to minimum,
Long life of saw-blade,
Full contact of teeth,
And best general results.

SAWS

for Railroads, Steel Foundries,
Bridge Works, Rolling Mills,
Etc., a Specialty.

— AMERICAN —**PIC IRON****Storage Warrant Co.**

(Bank of America Building.)

44 Wall Street, - NEW YORK.

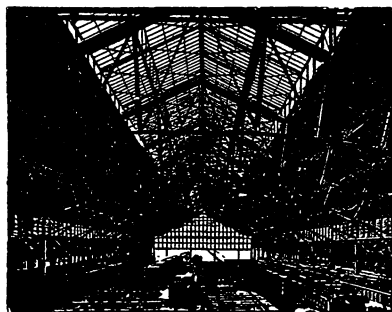
Correspondence of Furnaces Invited.

IRON AND STEEL ROOFING.

Corrugated Iron, Galvanized Eave Trough
and Conductor Pipe, Roofing Paints, etc.

Cambridge Roofing Co., Cambridge, O.

Corrugated, Crimped and Clap-Board Iron Roofing & Siding

Iron Buildings, Roofs, Doors, Shutters, Cornices,
Skylights, Bridges, &c.**MOSELEY IRON BRIDGE AND ROOF CO.,**
Office, 5 Day Street, Room 13, NEW YORK.New Passenger Station, C. R. R. of
N. J., Jersey City, N. J., over
30,000 square feet of Glass.**SKYLIGHTS**

ERECTED ANYWHERE.

CONSTRUCTED ON
"Helliwell System" Imperishable Glazing.
(Sole Agents).Warranted tight and free from drip. Built by
PLENTY HORTICULTURAL AND SKYLIGHT WORKS,
145 Liberty St., New York City.Iron Palm-houses, Greenhouses, Conserva-
tories and Skylights a Specialty.Illustrated Catalogue free. Correspondence
Solicited.**A. MILNE & CO.,**
Iron and Steel
IMPORTERS AND DEALERS,
No. 1 Broadway, New York.
8 Oliver St., Boston.**BORDEN & LOVELL,**
70 AND 71 WEST STREET
NEW YORK.

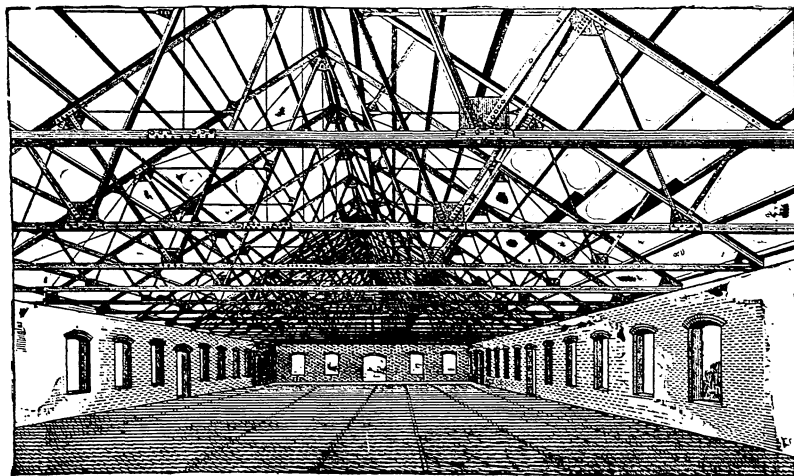
Steel, Iron and Wire Nails.

CHAS. J. STEBBINS,
103 Reade St., New York,
Steel and Iron Nails.**PHILLIPS, TOWNSEND & CO.,**
North Penn Junction, Philadelphia.**WIRE NAILS, - - -**
- - - NORWAY RIVETS.Rivets marked "P" are not of our
make. We make only first-class NORWAY
IRON RIVETS.**Gautier Steel Department of Cambria Iron Co.,****JOHNSTOWN, PA.,**

MANUFACTURERS OF

Merchant Bar Steel:Including Tire, Toe Calk, Machinery, Carriage
Spring, Railroad Spring, Hoe, Rake, Fork,
etc.**Agricultural Steel and Shapes:**Finger Bars, Knife Backs, Rake Teeth, Bundle
Carrier Teeth, Tedder Forks and Springs, Spring
Harrow Teeth, Harrow (Drag) Teeth, Seat
Springs, etc.**Plow Steel:**Flat and Finished Plow Shapes, Digger Blades,
Slabs (Penn and Pernot), Hammered Lay,
Rolled Lay, etc.**COLD ROLLED STEEL SHAFTING.****STEEL HARROW DISCS.****CAMBRIA LINK BARB WIRE.**New York Office, Philadelphia Office, Chicago Office
102 Chambers St. S. W. Cor. 5th & Commerce Sts. 209 Phenix Building.
(No. 4.)**IRON AND STEEL BRIDGES, ROOFS AND BUILDINGS****BOSTON BRIDGE WORKS,**

Engineers and Builders,

MASON BUILDING, BOSTON, MASS.

Roof of Machine Shop at Portsmouth (N. H.) Navy Yard.

INQUIRIES SOLICITED.D. H. ANDREWS, Prop'r.
J. R. WORCESTER, Chief Eng'r.A. S. MILLER, Jr., Sec'y.
R. H. BROWN, Con. Eng'r**The Berlin Iron Bridge Co.**Our new catalogue of over 300 pages, illustrating and de-
scribing a large number of Iron and Steel Buildings, Roofs and
Bridges designed and built by us is now ready and will be
mailed on application.**OFFICE AND WORKS, - EAST BERLIN, CONN.****BOOKS**THE NEWEST BOOKS ON Metal Working, Iron, Steel and
Metallurgy; Mining, Mechanical and Civil Engineering; Casting and
Founding; Electricity and Electric Lighting; Draftsmanship,
Architecture and Building, promptly supplied on receipt of price.
SEND FOR CATALOGUES, mentioning the kind of books
you are looking for.

DAVID WILLIAMS, 96-102 Reade St., New York.

Lukens Iron and Steel Co.

INCORPORATED
1890.

The First to make Boiler Plates in America.

Chas. Huston, Pres.

A. F. Huston, Vice-Prest.

C. L. Huston, Genl. Mgr.

Robt. B. Haines, Jr., Secy.

Jos. Humpton, Treas.

STEEL AND IRON PLATES

TO EXTREME DIMENSIONS.

WIDTHS UP TO 10 FEET.

THICKNESS, 3-16 INCH TO 1 1/4 INCH.

—ESTABLISHED 1810.—

WORKS:

Coatesville, Pa.

PHILADELPHIA OFFICE:

62 & 64 Bullitt Bldg.

FRANK SAMUEL,
136-138 So. 4th St.,
Philadelphia.

LOW PHOSPHORUS

PIC IRON—.03 or under.
SCRAP—.03 or .05 or under.
ORE—For O. H. and Furnace Use
MELTING BAR—
Open Hearth and Bessemer Billets,
Skelp, Muck Bars and Scrap, Foundry
and Bessemer Pig Iron.
Syracuse Tube Co.'s Tubes and Pipe.

THE PHOENIX IRON CO., 410 Walnut St., Philadelphia,

MANUFACTURE ALL THEIR PRODUCTS BOTH IN

WROUGHT IRON AND OPEN HEARTH STEEL.

Beams, Channels, Deck Beams, Angles, Tee-bars, Zee-bars and other shapes, Round, Flat and Square BARS of all sizes, Especially adapted for Bridge and Ship Builders, Fire-proof Buildings, Shafting and all Structural Purposes.

SPECIALTIES, in Wrought Iron or Steel:—Phoenix Columns and Upset Eye-Bars of all sizes,

Roof Trusses, Girders, Joists and Built-up Shapes of every description.

AGENTS:—EDWARD CORNING & Co., 29 Broadway, NEW YORK; EDWARD CORNING & Co., 70 Kilby St., BOSTON, MASS.; JAMES B. STOKES, 152 Market St., SAN FRANCISCO. WESTERN OFFICE: A. C. STITES, 931 The Rookery, CHICAGO.

POTTSVILLE IRON AND STEEL CO., POTTSVILLE, PA.,

PHILADELPHIA OFFICE, 226 SOUTH 4th STREET

MANUFACTURERS OF ALL KINDS OF

STRUCTURAL IRON AND STEEL,

Viz., I Beams, Deck Beams, Channels, Tees, Angles, Plates and Bars; and also Open Hearth Steel Billets, Blooms and Slabs.

BREWERY, MALT AND ICE HOUSE CONSTRUCTION A SPECIALTY.

Designers and Constructors of Roofs, Trusses, Columns, &c.

TESTED CHAINS.

BRADLEE - & - CO., - EMPIRE - CHAIN - WORKS

Beach & Otis Sts., - - - Philadelphia.

Chains for Foundry Cranes and Slings, "D. B. G." Special Crane Chain. Steel and Iron Dredging, Slope and Mining Chains. Ship's Cables and Marine Railway Chains.

BARCLAY W. COTTON & CO.,
Successors to ESHERICK, COTTON & CO.,

IRON and STEEL MERCHANTS,

418 Walnut Street, - Philadelphia.

MIFFLIN WHEELER.

G. W. NICOLLS.

Nicolls, Wheeler & Co.,

FORMERLY

SITES, WHEELER & CO.,

216 South Third Street, Philadelphia, Pa.

—DEALERS IN—

IRON AND STEEL SCRAP,

Pig Iron, Muck Bars, Charcoal Blooms, &c., &c.
Steel and Iron Plates, New and Old Rails,

S. T. WELLMAN, President.

JOHN P. CROZER, Treasurer.

C. H. WELLMAN, Superintendent

S. H. CHAUVENET, Vice-President.

RICHARD PETERS, Jr., Secretary.

WELLMAN IRON AND STEEL CO.

—MANUFACTURERS OF—

Highest Grade Open Hearth Low Phosphorus Steel Fire Box and

Boiler Plate. Bessemer Steel Ship and Tank Plate. Open

Hearth and Bessemer Blooms and Slabs.

Low Phosphorus Pig Iron.

—PLATES UP TO 126 INCHES IN WIDTH.—

General Office and Works, Thurlow, Delaware County, Pa.

Chicago, Ills., No. 656 "The Rookery."

New York, N. Y., No. 7 Nassau Street.

E. W. CRAMER, Agent.

J. H. BELCHER, Agent.

EDWARD CORNING & CO.,

MANUFACTURERS' AGENTS AND COMMISSION MERCHANTS.

BEAMS, CHANNELS,
ANGLES, TEES,
PLATES, BARS, RODS.

IRON AND STEEL

HOOPS, BANDS,
SPIKES, FISH-PLATES,
BOLTS, NUTS, RIVETS.

291 BROADWAY,
NEW YORK.

237 SO. THIRD ST.,
PHILADELPHIA.

70 KILBY ST.,
BOSTON.

CORRESPONDENCE SOLICITED WITH BUYERS AND WITH MANUFACTURERS

W. S. PILLING.

T. I. CRANE

PILLING—AND—CRANE.**IRON ORES:** Lake Superior, Foreign, Concentrates, Magnetic and native Self-fluxing.**PIC IRON:** Low Phosphorus, Open-hearth, Bessemer and other grades.**STEEL:** In Blooms, Slabs and Billets, and scrap.**COKE:** For Furnace and Foundry use.

BULLITT BUILDING, 141 S. FOURTH ST. PHILADELPHIA.

E. R. MANN & CO.,

Sole Agents.

ACME PIG IRON.

Guaranteed .03 % or lower in Phosphorus.

Blooms, Slabs, Plates, Sheets, Skelp, Muck-Bar and Scrap. Foreign and American Ore. Riverside Steel Pipe. Syracuse Boiler Tubes.

147 SOUTH 4th STREET, - - PHILADELPHIA

ALAN WOOD COMPANY,

MANUFACTURERS OF

Patent Planished, Galvanized, Common, Best Refined, Cleaned and Charcoal Bloom,
PLATE & SHEET IRON.

ALSO LIGHT PLATES AND SHEETS OF STEEL,

No. 519 Arch Street, Philadelphia. Pa.

Orders solicited especially for Corrugated, Gasholder, Pan and Elbow, Water Pipe, Smoke Stack Tank and Boat Iron; Last, Stamping, Ferrule Locomotive Headlight and Jacket Iron.

CUMBERLAND NAIL AND IRON CO.,

MANUFACTURERS OF

"CUMBERLAND" NAILS & WROUGHT IRON PIPE,

43 North Water St., and 44 North Delaware Ave., PHILADELPHIA.

J. J. MOHR,

Bullitt Building, No. 181 South Fourth St., Philadelphia, Pa.

—SOLE AGENT FOR—

Sheridan, Temple, Brooke, Leesport, Mill Creek, Keystone, Mt. Laurel, Logan and Oley FOUN-
DRY, FORGE, CHARCOAL AND BESSEMER PIG IRON.

Dealer in Scrap, Old Car Wheels, Muck Bars and Connellsville Coke.

High Grade Tested Chains.

JAMES McKAY & CO., 29th and Liberty Sts., Pittsburgh, Pa.,

Manufacturers of Coil, Crane and Stud Chain. We also manufacture High Grade Steel Chain made of Basic Steel and Special Crane Chain made of U. S. Iron.

JAMES G. LINDSAY & CO.,

BULLITT BUILDING, 133 South Fourth St., PHILA.

IRON & STEEL STRUCTURAL MATERIAL

For all Purposes. Estimates Furnished for Iron and Steel Structures.



MERRILL BROS., 465 to 471 Kent Ave., Brooklyn, E.D., N. Y

FITZSIMONS & CO.,

—MANUFACTURERS—

**COLD
DRAWN****SHAFTING****IRON
STEEL**

CLEVELAND, OHIO.

EDWARD J. ETTING,
IRON BROKER & COMMISSION MERCHANT222 S. THIRD ST., PHILADELPHIA, PA.
Fig, Bar and Railroad Iron, Old Rails, Scrap.

AGENT FOR THE

MOUNT SAVAGE FIRE BRICK,

Eastern Penna., West New Jersey and Delaware.

Agent TRENTON IRON CO.,

For the Sale of Wire and Wire Rope.

Longdale (Va.) and other Pig Irons.

STORAGE YARD, Pier No. 57 South (old Navy Yard), which is connected with Penn. R. R. and its various connections. Negotiable Warehouse Receipts Issued. CASH ADVANCES MADE ON IRON.

ESTABLISHED 1869.

JEROME KEELEY & CO.,

303 WALNUT STREET, PHILADELPHIA.

Foundry & Forge Pig Irons,**Iron Ores, Coke, Coal,****Steel Blooms, Billets, Rails, etc.**
Muck Bars, Blooms, Scrap Iron.

Consulting Engineers in Metallurgy and Mining.

E. H. Wilson.

A. Kaiser.

J. B. M. Hiron

E. H. WILSON & CO.,

929 and 934 South Third St, Philadelphia,

BROKERS AND DEALERS IN

IRON AND STEEL.

Correspondence solicited.

J. W. Hoffman & Co.,

333 and 335 Walnut Street,

COMMISSION MERCHANTS,**PIG IRON,**

Iron and Steel Plates and Shapes. Rails, Cars and Locomotives, and Railroad Equipment generally.

CORRESPONDENCE SOLICITED.

JOHN L. HOGAN & CO.,

IRON COMMISSION MERCHANTS,

Bullitt Building, 135 South Fourth St., Phila.

Agents for Brier Hill, Lehigh, Strathers

AND MUIRKIRK PIG IRON,

Delaware Rolling Mill, muck bars. Youngstown Steel Co., Connellsville Coke.

NORTH BROTHERS MFG. CO.,**Iron and Brass Founders,***Light Castings a Specialty.*N. W. Cor. 23d and Race Streets,
PHILADELPHIA.

Correspondence solicited.

A. R. WHITNEY & CO.,

MANUFACTURERS AND DEALERS IN

IRON and STEEL.

AGENCIES:

CARNEGIE STEEL CO., Limited, Structural Material, Steel and Iron Columns, Beams, Channels, Shapes and Plates. Steel Beams Rolled to 24 inches deep.

PORTAGE IRON CO., Limited, Merchant Iron, Bars, Angles, Hoops and Cotton Ties.

BROOKLYN WIRE NAIL CO., Steel Wire Nails. Export Nails a Specialty.

RIVERSIDE IRON WORKS, Steel Pipe.

GLASGOW TUBE WORKS, Boiler Flues.

AMERICAN WIRE NAIL MACHINES. Over 900 working satisfactorily in the United States, 25 in Europe and 100 in Canada.

THE SEIDELL & HASTINGS CO., Charcoal-Iron Boiler Plates.

Plans and estimates furnished and contracts made for Iron and Steel structures of every description. Please address,

29 Broadway, New York.
P. O. Box 33.

O. B. Houston.

J. Max Bernard.

H. H. Houston.

C. B. HOUSTON & CO.,

Bullitt Building.

PHILADELPHIA.

Pig Iron, Coal, Coke, Steel Rails, Structural Iron, steel Castings and Fire Brick.

Sole Agents for PAXTON ROLLING MILLS.

STEEL AND IRON PLATES

FRANCIS HOBSON, SEAMAN & CO.,

Successors to FRANCIS HOBSON & SON,
DON STEEL WORKS, SHEFFIELD,

Sole Manufacturers of

HOBSON'S "CHOICE" **(XX)** Extra Best and "Warranted Best"
Cast Steels for Tools, etc.

HOBSON'S "CHOICE" Extra Quality Needle Wire.

SEAMAN'S "**NELSON**" Brand Extra Cast Steel for Turning Hardest Chilled Rolls, &c.
WAREHOUSE, 97 John St., New York. CHAS. HUGILL, Agent.

THOS. FIRTH & SONS, LIMITED, SHEFFIELD.
CRUCIBLE CAST STEEL.

JERE ABBOTT & CO., Agents and Importers of
SWEDISH IRON,

85 OLIVER ST. BOSTON.

23 CLIFF ST., NEW YORK.

S. & C. WARDLOW, SHEFFIELD, ENGLAND.

Manufacturers of the Celebrated Cast and Double Shear Steel

in Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Razors, Carvers, Butchers' Knives, Files, Band Saws, Clock, Watch and all other Springs; also Sole Makers of the Special Brand "**TOUGH**" Cast Steel for Leather Splitting and Machine Knives of every description, and for Turning and all other Tools, Dies and Punches.

Office and Warehouse, 95 John St. New York

Frank S. Pilditch, Agent.

GUSTAF LUNDBERG,

AGENT FOR N. M. HÖGLUND'S SONS & CO., OF STOCKHOLM
Swedish and Norway Iron.

Bessemer and Open Hearth Steel.

19 KILBY STREET, BOSTON.

CARLISLE **KAYSER, ELLISON & CO., SHEFFIELD, ENGLAND**
WORKS, Late WILSON HAWKSWORTH, ELLISON & CO.,

(ESTABLISHED 1825.)

CRUCIBLE STEEL AND STEEL WIRE.

WETHERELL BROS., Agents,

81 OLIVER STREET, BOSTON.

98 LIBERTY STREET, NEW YORK.

JONAS & COLVER CONTINENTAL STEEL WORKS, SHEFFIELD, ENGLAND,

MANUFACTURERS OF ALL KINDS OF STEEL.

Tool Steel, Drill Rods, Needle Wire, Hot Rolled Sheet Steel, Cold Rolled Steel for Corset Springs, Band Saws, Clock and Watch Springs and Parts, and all other Purposes.

HERMANN BOKER & CO., 101 & 103 Duane Street,

(Formerly CARL F. BOKER),

Sole Agents and Importers of Steel and Crucible Wire Rods, &c.

JESSOP'S STEEL

MANUFACTURED BY

WM. JESSOP & SONS, L'D.

**OF Best Quality,
IN Bars, Sheets and Plates**

Large assortment of sizes in stock at

91 John St.

And other Agencies.

NEW YORK

SHEFFIELD, ENGLAND.

Gold Medal Paris, 1889.

WIRE

DRAWING

WORTLES, PLATES and JEWEL DIES.

DIES

NEWTON & SHIPMAN.

83 John St., - New York.

PENNSYLVANIA STEEL COMPANY. WORKS AT STEELTON, PA.

RAILS OF ALL SIZES & SHAPES. STEEL SPLICES & FASTENINGS. ANGLES & BARS. SWITCHES. RAILROAD CROSSINGS. RAILROAD FROGS AND CROSSINGS. SWITCHES. SWITCH FIXTURES & C. & G. FOR TRACKS OF ALL SORTS, IN RAILROADS, STREET RAILWAYS, MINES, QUARRIES, MILLS, FACTORIES, & WORKS.

BILLETTS, SLABS, BLOOMS FOR BOILER, BRIDGES, ROOFS, VIADUCTS & BUILDINGS. TANK & SHIP PLATE. RIVETS, WIRE, NAILS, AND VARIOUS PURPOSES.

GENERAL OFFICES, 208 So. Fourth St., PHILADELPHIA. | NEW YORK SALES OFFICE, No. 2 Wall Street (corner Broadway). | BOSTON SALES OFFICE, 70 Kilby Street (Mason Building). | SUPERINTENDENT'S OFFICE, STEELTON, PA.

ÆTNA IRON and STEEL COMPANY, BRIDGEPORT, OHIO.

MANUFACTURERS OF

Soft Steel and Refined Iron,

Bars, Light Section Rails, Angles, Ties, Grooves and Other Special Shapes, Steel Tool Smoke Stack and Tank Sheets and Roofing Sheets. Special attention to orders for Bars or Sheets of odd sizes and shapes, or for special purposes.

ILLINOIS STEEL COMPANY

General Offices, TENTH FLOOR, "ROOKERY," CHICAGO, ILL.,

— MANUFACTURE —

Bessemer, Foundry and Mill Pig Iron, Spiegel and Ferro-Manganese,

Iron and Steel Merchant Bar, Rail Fastenings, Light "T" and Street Rails, Steel Billets, Wire Rods, Iron or Steel Car Truck Channels, Steel "I" Beams and Structural Shapes, and

BESSEMER STEEL RAILS.

Julian L. Yale,

Gen'l Sales Agent.

A. M. Crane,

Assistant Gen'l Sales Agent.

New York Office, 46 Wall St., New York City. Milwaukee Office, 151 N. W. Ins. Bldg., Milwaukee, Wis. D. E. GARRISON & CO., Agents, Laclede Building, St. Louis, Mo.

H. S. PICKANDS, } CHICAGO.
W. L. BROWN, }

PICKANDS, BROWN & CO.,

PICKANDS, MATHER & Co,
CLEVELAND.

Sole Agents Pig Iron Department Illinois Steel Company and Manufacturers and Dealers in

PIG IRON and IRON ORE,

1007, 1009 and 1011 Rookery Building, Chicago.

CARBON STEEL COMPANY,

PITTSBURGH, PA.,

— MANUFACTURERS OF —



Universal Mill Plates. Sheared Plates and Sheets. Boiler, Ship and Armor Plates. Also Nickel Steel Plates. List of Sizes Sent upon Application.

AGENCIES:

L. S. BOOMER, 647 The Rookery, Chicago, Ill. THE CONdit-FULLER CO., Perry-Payne Building, Cleveland, O.
GEO. KINSEY & CO., 249 West Fourth Street, Cincinnati, O. JAS. G. LINDSAY & CO., Bullitt Building, Philadelphia, Pa.

CAMBRIA STEEL,

Steel Rails, STANDARD AND LIGHT WEIGHTS, Street Rails and Railway Fastenings,
BESSEMER AND OPEN-HEARTH BLOOMS, BILLETS AND BARS.
Steel Axles, Steel Angles, Steel Channels, Steel Forgings,
CAMBRIA IRON COMPANY, Office, 218 S. Fourth St., Philadelphia.
 Chicago Office, Phoenix Building.
 (WORKS AT JOHNSTOWN, PA.)

A. & P. ROBERTS & COMPANY,
Pencoyd Iron Works, MANUFACTURERS OF
Wrought Iron and Open Hearth Steel,
 OFFICE: 261 S. 4th Street, PHILADELPHIA, Pa.

Pencoyd Bridge & Construction Co., DESIGNERS AND MANUFACTURERS OF
Bridges, Viaducts, Turn Tables, Etc.
 WORKS, PENCYD, PA.

LUCKNOW FORGE.
JOHN W. REILY
 Fort Hunter, P. O., Dauphin Co., Pa.
 MANUFACTURER OF
 Blooms and Billets for Boiler Plate, Tubes,
 Sheet Iron and Wire, made from
 Pig Iron and Scrap.
 Prices Quoted—Correspondence Solicited.

GEO. H. SIBELL & CO.,
Brokers and Commission Merchants,
 62-64 Michigan Ave., Chicago.
PIG IRON, COKE, FIRE BRICK, RAILROAD
IRON, CAST AND WROUGHT SCRAP.
 Price Quoted. Correspondence Invited.

—THE—
Chemical Analysis of Iron.

A Complete Account of all the Best
 Known Methods for the

Analysis of Iron, Steel, Pig Iron, Iron
Ore, Limestone, Slag, Clay, Sand,
Coal, Coke, and Furnace and
Producer Gases.

SECOND EDITION.

—BY—
ANDREW ALEXANDER BLAIR,

Graduate United States Naval Academy, 1886; Chief
 Chemist United States Board appointed to Test
 Iron, Steel and other Metals, 1876; Chief Chem-
 ist United States Geological Survey and
 Tenth Census, 1880; Member American
 Philosophical Society, etc.

Handsomely Illustrated by 120 Outline
 Engravings on Wood. Svo. 314 Pages.
 Half Morocco. \$4.00.

The reputation which this book has so quickly won
 for itself among analytical chemists will certainly be
 increased by the improvements in the second edition.
 Every means has been taken to bring it up fully to the
 times, by incorporating all the new and improved
 methods, necessitating the addition of thirty pages of
 letterpress and nine new cuts.

"This work may, in fine, be pronounced a useful
 summary of a special and important department of
 analytical chemistry by an author of prolonged and
 wide practical experience."—*Chemical News*, London.

"Mr. Blair's is a standard work which will prove
 the chief guide of the young chemist, and a frequent
 guide to more experienced analysts."—*The Iron Age*
 New York.

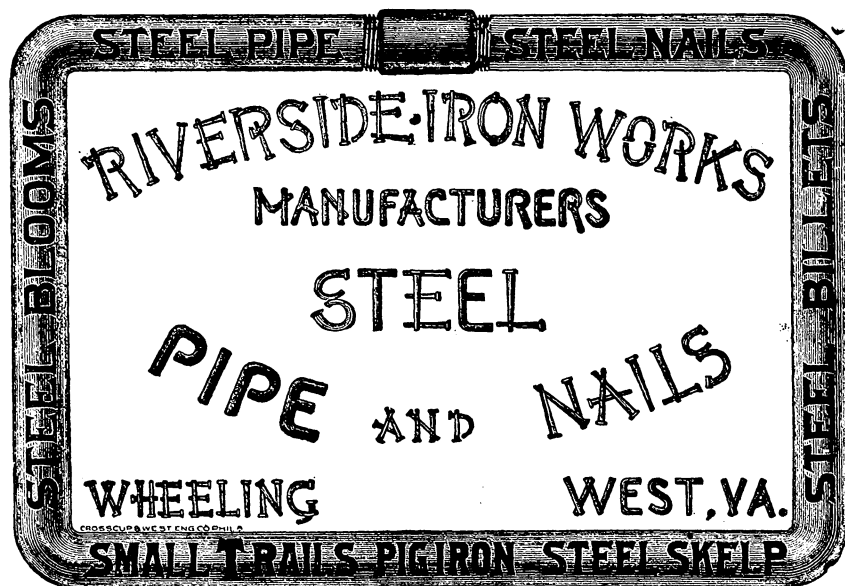
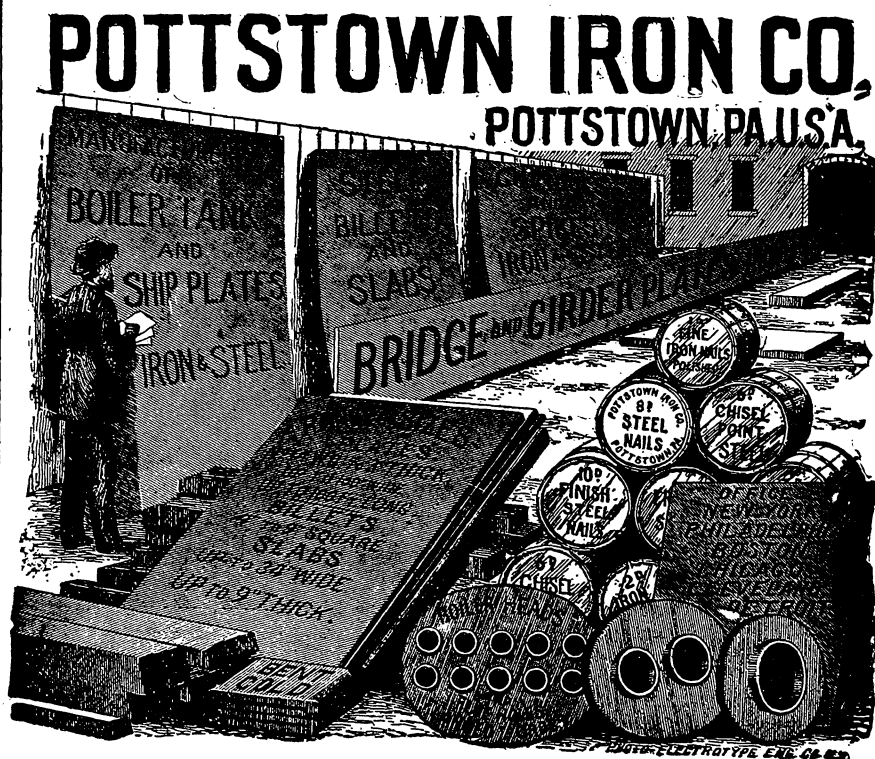
"All iron chemists will find this book an exceedingly
 useful laboratory companion."—*The Chemical Review*
 London.

"It is thorough, accurate, and so complete, as to be
 practically exhaustive of the important subject of
 which it treats."—*Philadelphia Iron*.

—FOR—
 SALE BY **DAVID WILLIAMS**

Publisher and Bookseller,

96-102 Reade St., New York.



THE ASCHMAN STEEL CASTING CO.,

MANUFACTURERS OF

Open Hearth Steel Castings of all Kinds.

Solid and Equal to Steel Forgings.

Send Sketch and Get Estimate.

Prompt Delivery.

OFFICE AND WORKS, SHARON, PA.

THE BETHLEHEM IRON COMPANY.

SOUTH BETHLEHEM, PENNA.

STEEL RAILS,

BILLETS AND MUCK BAR,

STEEL FORGINGS.

HOLLOW SHAFTING, CRANKS, ROLLS, GUNS AND ARMOR.

Rough, Machined or Finished, Fluid Compressed, Hydraulic Forged.

NEW YORK OFFICE, - - - 80 BROADWAY.

PASSAIC ROLLING MILL CO., Paterson, N. J.

—MANUFACTURE—

ROLLED STEEL or IRON BEAMS

Channels, Angles, Tees, Bars, Riveted Work, Forgings, Eye Bars, &c., &c.,

Also OPEN HEARTH STEEL BILLETS and SLABS.

NEW YORK OFFICE, - Rooms 151 and 152, No. 45 Broadway.

JUSTICE COX, Jr., IRON AND STEEL

No. 218 SOUTH 4th ST., PHILA'D, PA.

Agent Haldeman, Grubb & Co.'s Chickies Bessemer Pig Iron,
Mahoning Rolling Mill Co.'s Best Quality Skelp Iron and Steel,
for Pulaski Iron Co.'s High Grade Foundry and Forge Pig Iron.

Bars, Angles, Sheets, Tank and Bridge Plates, Muck Bars, Blooms, Scrap Iron and Tool Steel.

THE MONTOUR IRON & STEEL COMPANY,

DANVILLE, PA.



PIG IRON, T AND STREET RAILS,

Light Rails, 12 to 40 lbs. per yard.

RAIL JOINTS, SPIKES AND BAR IRON.

NAYLOR & CO.,

New York: 45 Wall Street.

PITTSBURGH, PA.: Lewis Block. PHILADELPHIA, PA.: Bullitt Bldg.
CINCINNATI, OHIO: Johnston Bldg.

IRON ORE, PIG IRON, SPIEGEL AND FERRO,

IRON AND STEEL WIRE ROOS, STEEL BLOOMS, BILLETS AND
SLABS, METALS AND OLD MATERIALS.

- R. MUSHET'S -

"SPECIAL," STEEL "TITANIC,"

FOR LATHES AND PLANER TOOLS. For Chisels, Taps, Dies, Chilled Roll Turning, Punches, &c., &c.

(The "Trade-Marks" of which are registered in the United States.)

MANUFACTURED ONLY BY

SAMUEL OSBORN & CO., - - Clyde Steel & Iron-Works, Sheffield, Eng.

SOLE REPRESENTATIVES IN THE UNITED STATES,

B. M. JONES & CO., Nos. 11 and 13 Oliver St., Boston.

No. 143 LIBERTY STREET, NEW YORK.

STEEL

Gautier Steel.

SEE PAGE 17.

IRON AND STEEL

BARS, ANGLES, CHANNELS, BEAMS AND
STRUCTURAL SHAPES.

Bridge, Boiler, Tank and Ship Plates.

FOUNDRY and FORGE

Pig Iron, Steel Slabs, Billets and Ingots

CHARLES K. BARNES & CO..

224 South Fourth St., PHILADELPHIA.

L. & R. WISTER & CO.,

IRON COMMISSION MERCHANTS,

257 So. 4th St., Philadelphia.

Agents for the following Foundry and Forge Pigs:
Irons: Dunbar, Kemble, Tuscarawas (Black Band), Wyebrooke C. B. Charcoal Pig Iron,
Warner & Co.'s (Middlesboro, England) Carbonizing and Malleable Irons.
Dealers in all kinds of Scrap Iron and Steel.

HENRY LEVIS & CO.,

Manufacturers' Agents

For Iron and Steel Rails, Car Wheels, Boiler
and Sheet Iron and General

Railway Equipments.

Old Rails, Axles and Wheels bought and sold.
234 S. 4th St., Philadelphia.

Established 1847.

A. WHITNEY & SONS,

CAR WHEEL WORKS,

PHILADELPHIA:

Special Wheels for Furnace and Mine Cars.

Manhattan Rolling Mill.

JOHN LEONARD,

446 to 452 West St., New York.

MANUFACTURER OF

HORSE SHOE AND BAR IRON

BLACKSMITH SUPPLIES.

Brooklyn Branch, 589 Kent Ave.

OGDEN & WALLACE,

85, 87, 89 & 91 Elm St., New York.

IRON AND STEEL

Of every description kept in stock.

Agents for Park, Brother & Co.'s

BLACK DIAMOND STEEL.

All sizes of Cast and Machinery Steel constantly
on hand.

WILLIAM H. WALLACE & CO.,

IRON AND STEEL,

10, 12 and 14 ALBANY ST.,
and 131 WASHINGTON ST.,
NEW YORK.

Wm. H. Wallace. Wm. Bispham. E. C. Wallace.

THE MAHONING VALLEY IRON CO.,

—MANUFACTURERS OF—

Bar, Band, Sheet Plate and Tank Iron,
Angle Iron, Nails, Boat Spikes and Rivets.

YOUNGSTOWN, OHIO.

ESTABLISHED IN 1848. **SINGER, NIMICK & CO., Ltd.** PITTSBURGH, PA.

—MANUFACTURERS OF ALL KINDS OF—

Hammered and Rolled

STEEL.

Warranted Equal to any Produced.



HIGH GRADE SPECIAL Crucible Tool Cast Steel, for all purposes requiring the **very finest** quality.

SINGER'S ANNEALED EXTRA Crucible Tool Cast Steel, for Dies, Cutters, Surgical Instruments, Forceps, and all other purposes requiring an **extra fine** quality.

BEST Crucible Tool Cast Steel, for all purposes requiring steel of **Standard** quality, such as Turning Tools, Taps, Dies, Drills, Punches, Shear Knives, Cold Chisels, or Edge and Machinists' Tools generally, and for Mining and Quarrying purposes.

SAW STEEL, for Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

HOT ROLLED SHEET STEEL, for Springs, Billet Web and Hand Saws, Nicker Saws, Pocket Knives, Blades and Backs, Drawing and Stamping Cold, &c., &c.

BRIGHT COLD ROLLED SHEET and STRIP STEEL, for Cold Drawing, Stamping and Bending; for Bells, Cups, Ferrules, Springs, Keys, Chains, Sewing Machine and Type-Writer parts, and to take the place of Sheet Brass, all of unequalled finish and accuracy of gauge.

ROUND MACHINERY STEEL, for Shafting, Rollers, Spindles, &c., &c.

AGRICULTURAL STEEL.

"Iron Centre" Cast Plow Steel.

"Soft Steel Centre" Cast Plow Steel.

"Soft Steel Back" Cast Plow Steel.

"Extra Thick Face Centre" Cast Plow Steel.

"Special" (Solid Soft Center) Plow Steel.

Crucible Cast Plow Steel.

Steel Rotary Harrow Discs.

Finished Rolling Plow Colters.

Agricultural Steel Cut to Pattern.

Also Wagon and Carriage Springs, Axles and Steel Tire.

Represented at **243 Pearl and 18 Cliff Streets, NEW YORK**, by

HOGAN & SON, General Agents for Eastern and New England States.

GEORGE M. HOGAN, 417 Commerce St., Philadelphia; FITZ, DANA & CO., 110 North St., Boston, and

W. E. STOCKTON, 16 & 18 West Lake St., Chicago.

HUGH RUSSEL, TEMPLE BUILDING, 185 ST. JAMES ST., MONTREAL, CANADA.

LA BELLE STEEL CO.,

Ridge Avenue and Belmont Street, Allegheny City, Pa. Post Office Address, Pittsburgh, Pa

MANUFACTURERS OF ALL KINDS OF **STEEL** SPRINGS, AXLES, RAKE TEETH, Etc.

WETHERELL BROS., EASTERN REPRESENTATIVES, 31 Oliver St., Boston and 93 Liberty St. N.Y.

RICE, LEWIS & SON, Toronto, Ont.

J. TATNALL LEA & CO.,

No. 400 Chestnut Street, Philadelphia.

**BESSEMER, MILL AND FOUNDRY PIG IRON,
MUCK BARS AND IRON ORES.**

W. Dewees Wood Co.,



MANUFACTURERS OF PATENT

PLANISHED SHEET IRON

PATENTED

Oct. 6th, 1874.	Feb. 12th, 1884.	March 4th, 1884.
Oct. 17th, 1876.	Sept. 9th, 1878.	April 16th, 1884.
Feb. 6th, 1877.	Jan. 11th, 1879.	June 10th, 1884.
Jan. 10th, 1882.	Dec. 10th, 1878.	Jan. 6th, 1885.
Jan. 1st, 1884.		Aug. 31, 1886.

Guaranteed fully equal, in all respects, to the Imported Russia Iron.

—ALSO—

Wood's Smooth Finished Sheet Irons and Sheet Steel Cleaned and Free from Dust.

GENERAL OFFICES AND WORKS:

MCKEESPORT PA.

Branch Office: 111 Water Street, Pittsburgh, Pa

J. WESLEY PULLMAN,

No. 238 St. Third St., Philadelphia,

BEST IRON ORES

New Jersey. New York. Lake Superior

WARWICK PIG IRON

— SOHO IRON & STEEL WORKS —

MOORHEAD & McCLEANE CO.
MANUFACTURERS OF

PLATE IRON & STEEL.

GALVANIZED SHEET IRON

PLATES SPECIAL WIDE SHEETS AND EXTRA LONG

SKELP IRONS

CORRUGATED & ROOFING IRONS

PITTSBURGH.

OFFICES AND WORKS.

EASTERN WAREHOUSE. | WESTERN WAREHOUSE.
No. 81 JOHN STREET, | Nos. 16 & 18 W. LAKE ST.
NEW YORK. | CHICAGO.

SCULLY STEEL AND IRON CO.,

Office, 64 So. Canal St., Chicago. Warehouses, { 62, 64, 66 So. Canal St.
61, 63, 65 W. Water St.

Steel and Iron Plates, Sheets, Boiler Tubes, Rivets, Angles, Tees, etc.

RAILWAY SUPPLIES.

Western Agents for LUKEN'S IRON & STEEL CO., Coatesville, Pa.; J. WOOD & BROS. CO., Conshohocken Pa.; DIAMOND STATE IRON CO., Wilmington, Del.

ELECTRIC ARC PROCESS OF METAL WORKING.

The fundamental claims covering the practical utilization of the intense heat of the electric arc for metal-working purposes are patented to the **THOMSON ELECTRIC WELDING COMPANY, 89 State St., Boston, Mass.**

This system is capable of extended application to metal-working operations, and is safe and economical.

It is adapted to Longitudinal welding of pipes, sheet-metal articles, &c., closing up blow-holes in Steel, Iron, Brass and Copper Castings and locally treating or working metal articles of all kinds.

Special generators are supplied or current may be taken from local power or lighting mains.

Applications for license should be addressed to

THOMSON ELECTRIC WELDING COMPANY,

89 State Street, Boston, Mass.

STEEL CASTINGS,

HEAVY and LIGHT,

For railroads, mills, gearing, machinery, mining, construction and all purposes where extra strength or hardness is required. Made by

Shickle-Harrison & Howard Iron Co., St. Louis

TAYLOR IRON AND STEEL COMPANY. STEEL FOUNDERS

Licenses in the United States for making Hadfield's Manganese Steel.

STEEL CASTINGS OF EVERY DESCRIPTION.

Specialties: Steel Tired and Solid Steel Wheels; Chilled Iron Wheels; Iron and Steel Axles, etc., etc.

General Office and Works, **High Bridge, New Jersey.**



DROP FORGING.

ESTIMATES GIVEN ON APPLICATION.

Sole Manufacturers of Ahlstrom's Patent Parallel Double

EXPANSION BOLTS,

also Single Expansion Bolts. Catalogues mailed on application

W. C. BOONE MFG. CO., - Office and Factory, - BOONTON, N. J.

GEORGE MESTA, Prest.

W. D. ROWAN, Sec.

J. O. HORNING, Treas.

LEECHBURG FOUNDRY & MACHINE CO.,

Office: LEWIS BLOCK, Pittsburgh, Pa.

Sheet and Bar Mills, Shears, Squeezers and Roll-Lathes.

ROLLS. MESTA'S PATENT PICKLING MACHINES AND TIN PLATE MACHINERY.

ESTIMATES GIVEN ON COMPLETE TIN PLATE PLANTS.



Hundreds of testimonials showing these castings have proved the most satisfactory and economical for all purposes requiring strength and durability.

CHROME STEEL WORKS,
Brooklyn, N. Y.

DROP-FORGINGS

—AND—

DIES TO ORDER.

First Class Work.

THE HERBRAND CO., - FREMONT, O.

PIERSON & CO.,

—DEALERS IN—

IRON and STEEL

OF EVERY DESCRIPTION,

**24 to 27 West St., cor. Morris,
NEW YORK.**

WILHELM & CO.,

Telegram Building, ROOMS, 15, 16, 17 & 18,
HARRISBURG, PA.

Iron Ore, Pig Iron, Boiler Plates, Nails,
Steel Rails, Coke, Bituminous Coal.

Telephone, No. 1503.
Western Union and Postal Telegraph Wires in Office.
Cable Address, "WILHELM."

The Prospector's Field-Book and Guide in the Search for and the Easy Determination of Ores and other Useful Minerals. By Prof. H. S. OSBORN, LL.D. EXTRACT FROM THE PREFACE: In the following pages we have attempted to present such a view of the whole subject of prospecting for the useful minerals that any liberally educated reader may fully comprehend our meaning. We have therefore explained special terms where we have thought it convenient to use them, and where the technically educated student would not need an explanation. The table of contents and index have both been carefully prepared, and being very full, will make reference to any subject in the volume easy and satisfactory. 44 engravings. 175 pages \$1.50

For Sale by DAVID WILLIAMS, 96-102 Reade St., N. Y.

John H. Ricketson, Prest. Wm. Holmes, Treas.
A. G. Barnett, Sec'y.

A. GARRISON FOUNDRY CO.,

Manufacturers of Sand, Patent Homogeneous,
Steel and

Chilled Rolls

Ore and Clay Pulverizers, Rotary Squeezers,
Haskin's Patent Double Spiral Pinions and Roll-
ing Mill Castings of every description.

Office, Nos. 10 & 12 WOOD ST., PITTSBURGH, PA

BIRMINGHAM IRON FOUNDRY,

BIRMINGHAM, CONN.

CHILLED ROLLS AND ROLLING MILL MACHINERY,

McCoy Patent Mill Pinions,
Shears, Rotary Squeezers.

WIRE DRAWING MACHINERY

Special Rolling Machines for Gun Bar-
rels, Hoes, Pick and Axe Polls, Odd
Shapes and Tapers.

ESTABLISHED

1836.

FINE CRAY IRON

FRANKLIN IRON FOUNDRY,
The Burr and Houston Company

33-39 Franklin Street, Brooklyn (Green-
point), N. Y.

Special Attention Given to Fine Castings.
Telephone Call, Greenpoint 174.

POWDER

—FOR—

Blasting, Mining and Sporting.
ORANGE BRAND.

ELECTRIC BLASTING APPARATUS,
SAFETY FUSE, &c.

Send postal card for Illustrated Pamphlet,
showing sizes grains Powder, and describing
Blasting Apparatus. Mailed FREE.

LAFLIN & RAND POWDER CO.,

New York Office, 29 Murray St.

DYNAMITE,

RED STAR BRAND

For Mining, Quarrying & Stump Blasting.

Safety Fuse, Caps, Platinum Fuse, Leading
and Connecting Wire, with every other requis-
ite for Blasting Purposes. The especial atten-
tion of the hardware trade is invited to our
line of goods.

NEW YORK POWDER CO.,

62 Liberty St., New York.

Open Hearth Steel Castings of
Superior Quality.

THE SYRACUSE STEEL FOUNDRY CO.

135 West Fayette St., Syracuse, N. Y.
Prices on application

CHESS BROTHERS,

MANUFACTURERS OF A FULL LINE OF
SMALL CUT NAILS, TACKS, SHOE NAILS, ETC.

Always in stock. Special goods made to order.

SOFT STEEL PLATES.

Suitable for Implement manufacture and for all Blanking or Stamping uses,
of good surface, rolled carefully to gauges, ranging from No. 6 to 16, inclusive, in
widths up to 15½ inches and to multiples of lengths desired. Finished black or
scaled. And

EXPANDED METAL

In all its varieties of Fire-Proof Lath Fencing, Tree Guards, &c. Send for catalogues
and prices.

Office, 531 Wood St., PITTSBURGH, PA.

DROP FORGING

J. C. SPEIRS & CO. WORCESTER, MASS.

J.S. SEAMAN.
ROBT. SLEETH
GEO. BLACK

PHOENIX ROLL WORKS
SEAMAN, SLEETH & BLACK
OFFICE & WORKS
41 ST & 42ND ST & A.V.R.R.
PITTSBURGH, PA.

ESTABLISHED 1870

MANUFACTURE AND FINISH
ROLLS AND PINIONS
EXCLUSIVELY.
FOR ALL PURPOSES.



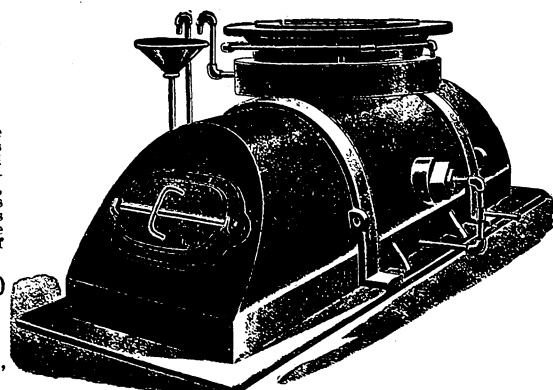
HIGGS WATER VALVE

FOR GAS FURNACES AND
PRODUCERS.

Used for reversing the gas from one
end of the furnace to the other. It is
kept cool by water in an upper and
lower chamber, and the butterfly or flap-
per which prevents it from burning,
warping or leaking and by its use saves
from 20 to 25 per cent. of fuel, saves
wasting of iron in the furnace by the
shortage of gas caused by the leaking of
the valve. Will last for years.

The TOTTEN & HOGG IRON AND
STEEL FOUNDRY CO.,

Office & Works, 24th St. and A. V. R. R.,
PITTSBURGH, PA.



THE CAMBRIDGE IRON & STEEL CO.

MANUFACTURERS OF

SHEET IRON AND SHEET STEEL



Squared Roofing Sheets a Specialty.



CAPACITY RANGES FROM NO. 30
26 INCHES WIDE TO 1-4 x 40 x 120

CORRESPONDENCE
SOLICITED

OFFICE AND WORKS CAMBRIDGE, OHIO.

—ESTABLISHED 1850.—

ARCADE MALLEABLE IRON CO.

WARREN MCFARLAND & CO.

Malleable Iron and Steel Castings,
WORCESTER, MASS.

Correspondence solicited. Prices given upon receipt of patterns
or samples.

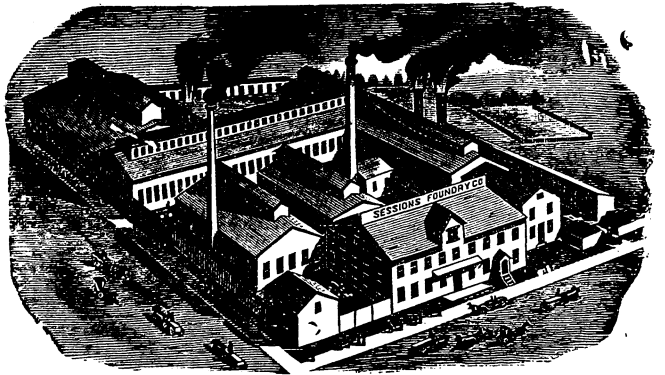
GEO. B. BUCKINGHAM.

IRON CASTINGS TO ORDER.

Small and Large Grey (or common) Iron Castings of uncommonly fine quality. Four large Cupolas run daily. Castings soft, smooth and strong. Prices very Low.

We make Castings for all purposes, such as Builders' and Domestic Hardware, Electrical work, Piano and Organ, Wringer, Furniture, Lamp and Chandelier and Agricultural Implement Castings, Grates, Furnace and Machinery Castings, &c., &c. If you buy any, write us, stating quantities. Send samples if possible.

SESSIONS FOUNDRY CO., Bristol, Conn.



Books for Assayers

The Assayer's Manual.

An abridged treatise on the systematic examination of ores and furnace and other artificial products. By BRUNO KERL; from the German by W. T. BRANNT; second American edition, edited, with additions, by F. LYNNWOOD GARRISON; 354 pages, illustrated cloth.....\$3

Notes on the Chemistry of Iron.

For professional men, students, iron and steel merchants and all interested in iron. Explaining the methods of analysis, and how to apply the results obtained. Third edition, revised and enlarged. By MAGNUS TROLLIUS; 143 pages; cloth.....\$2

System of Quantitative Chemical Analysis.

Edited by PROF. O. D. ALLEN, assisted by PROF. S. W. JOHNSON. Revised and corrected by DR. C. R. FRESNIUS; 883 pages; cloth.....\$6

Manual of Qualitative Chemical Analysis.

Translated into the new system and newly revised by Samuel W. Johnson, M. A. Ninth edition. By DR. C. R. FRESNIUS. 500 pages; cloth.....\$4

Quantitative Chemical Analysis by Electrolysis According to Original Methods.

Authorized translation from the German of Dr. Alex. Classen. By PROF. WM. HALE HERRICK. Teaching electrolytic methods, useful in laboratories for research, and in technical laboratories, especially those connected with metallurgical works. Cloth.....\$2.50

The Blowpipe in Chemistry, Mineralogy, and Geology.

Containing all known methods of anhydrous analysis, many working examples, and instructions for making apparatus. By LIEUT.-COLONEL W. A. ROSS, R.A., F.G.S. With 120 illustrations; 214 pages; cloth.....\$2

The Art of Electrolytic Separation of Metals.

Theoretical and Practical. By G. GORE. Fully illustrated; 8vo, cloth.....\$3.50

A Text Book of Assaying;

for the use of students, mine managers, assayers, &c. By J. J. and S. C. BERINGER; 400 page diagrams; cloth.....\$3.25

Exercises in Quantitative Chemical Analysis.

With a short treatise on gas analysis. By W. DITTMAR.....\$4.25

The Chemistry of Iron and Steel Making, and of their Practical Uses.

Written with the object of supplying to the producers and distributors of iron and steel, and to engineers, shipbuilders, architects and others concerned in the use of these important materials, the special scientific knowledge which they all should possess in simple, clear and readable language, the inevitable technicalities being explained as they occur. By U. MATTIEU WILLIAMS, F.C.S., F.R.A.S. Crown 8vo, cloth extra.....\$3

Any book published sent, postpaid, on receipt of price, by

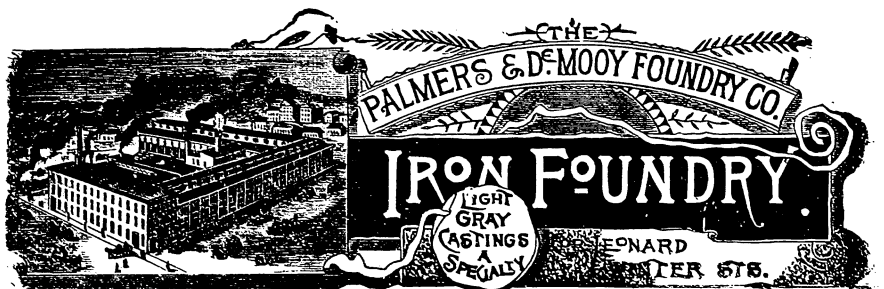
DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade Street, New York

MALLEABLE IRON CASTINGS TO ORDER:

We Carry a Full Line of
WAGON HARDWARE
NORTHWESTERN MALLEABLE IRON CO.
MILWAUKEE, WIS.



Soft Castings for Electrical Work and Sewing Machines. Fine Light Gray Iron Castings. Metal Patterns designed and made. Also Japanning and Galvanizing.

CLEVELAND, O.

STEEL CASTINGS

From 1-4 to 15,000 lb. Weight.

True to pattern, sound, solid, free from blow holes, and of great strength.

Stronger and more durable than iron forgings, in any position or for any service whatever.

60,000 CRANK SHAFTS and 50,000 GEAR WHEELS of this steel now running prove this.

Cross-Heads, Rockers, Piston-Heads, etc., for Locomotives.

STEEL CASTINGS of every description.

Send for Circulars and Prices to

CHESTER STEEL CASTINGS CO.,

Works: Chester, Pa.

Office: 407 Library St., Phila., Pa.

THE ROBINSON-REA MFG. CO.,

PITTSBURGH, PA.

**SAND AND CHILLED ROLLS.
TIN PLATE PLANTS COMPLETE.**

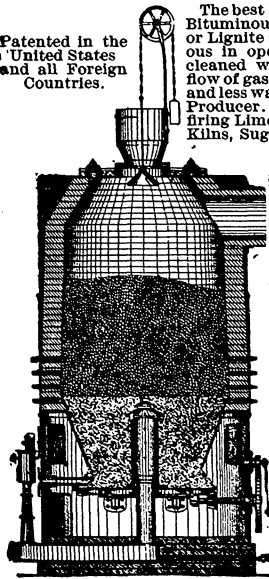
(No 5.)

R. D. Wood & Co. 400 Chestnut St.,
PHILADELPHIA.

SOLE MAKERS OF THE

**TAYLOR REVOLVING-BOTTOM
GAS PRODUCER.**

Patented in the
United States
and all Foreign
Countries.



The best Producer for either
Bituminous or Anthracite coal
or Lignite; absolutely continu-
ous in operation, as the fire is
cleaned without stopping the
flow of gas. Less labor required
and less waste than in any other
Producer. Producer Gas for
firing Lime, Brick and Pottery
Kilns, Sugar-house Char Kilns,
Bollers, etc.
Also applicable to
all Regenerative
Furnaces.
Send for Pamphlet.

**CAST IRON
PIPE**

MATHEWS'
FIRE HYDRANTS
EDDY VALVES,
VALVE
INDICATOR POSTS.

Heavy Loam Castings,
Special Machinery.

Water Power Pumps
and
TURBINES.

HYDRAULIC JIB and TRAVELING CRANES,
FREIGHT and CAR LIFTS, Etc.
GAS HOLDERS and GAS MACHINERY.

**S. CHENEY & SON,
GRAY IRON CASTINGS,**

CHEAP HEATING STOVES,
DIAMOND THIMBLES,

MANLIUS, N. Y.

DONALDSON IRON COMPANY,
MANUFACTURERS OF



CAST IRON PIPE
And Special Castings for Water and Gas. Also Flange Pipe
Emaus, Lehigh Co., Pa.

**Light
AND
Medium Weight
GRAY IRON
CASTINGS.**

WE SOLICIT CORRESPONDENCE
WITH THOSE WHO USE THE ABOVE.

- ★ We claim to have
few equals and no
superiors in quality.
- ★

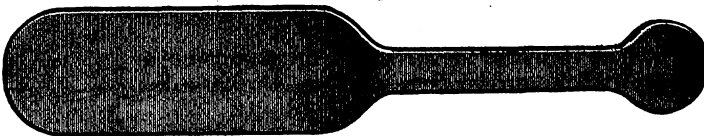
We have unusual capacity.
Two seven-foot cupolas.

**The Taylor &
Boggis Fdy. Co.**

521 Seneca St., Cleveland, O.

WYMAN & GORDON, Worcester, Mass.

DROP



FORGINGS.

HAIGHT & CLARK, IRON AND BRASS FOUNDERS, ALBANY, N. Y.
WE MAKE TO ORDER

**GRAY IRON, BRASS, COMPOSITION and ALUMI-
NUM BRONZE CASTINGS** of the very best quality.

Very much time saved by using clean and soft castings. We use only the best material. A trial will con-
vince you. PICKETS and ROSETTES for Wire Workers. Catalogue of same. NICKEL PLAT-
ING and JAPANNING, also METAL PATTERN MAKING. We invite correspondence.

THE CHICAGO FOUNDRY CO.
CHICAGO.
RAIL BEAM ROLLS STRUCTURAL BAR

W.W. FLINN, Pres. & Treas.

E. DYER, V. Pres.

W.M. DOWNS Secy.

I. S. SPENCER'S SONS, Guilford, Conn.,

—MAKE TO ORDER—

FINE GRAY IRON CASTINGS OF BEST MATERIAL AND
WORKMANSHIP.
Sound and Smooth BRASS and COMPOSITION CASTINGS and
HARDWARE.

SAMPLES SOLICITED FOR ESTIMATES.

DROP FORGINGS

Of Every Description, in Iron, Steel, Copper
and Aluminum.

Holst Hooks, Shafting Collars, Eye Bolts, Wrenches, Machine
Handles, Fence Ornaments.

SPECIAL ATTENTION GIVEN TO THE MANUFACTURE OF
SPECIAL FORGINGS.

PHILADELPHIA DROP FORGE COMPANY,
Office and Works, S. E. Cor. American and York Sts., Philadelphia.



THE JOHNSON FOUNDRY CO..
JOHNSTOWN, PA.
**CHILLED
AND SAND ROLLS.**
GENERAL CASTINGS.

STANDARD FOUNDRY & MFG. CO., - CLEVELAND, OHIO.

—HEADQUARTERS FOR—

LIGHT GRAY IRON CASTINGS.

—UNEQUALED IN—

SOFTNESS and SUPERIOR FINISH.

Our Castings in finishing will save time and tools. We solicit a trial order knowing that we can
please you. Send samples for prices.

TENSILE } 56,000 to 64,000 lbs.
STRAIN. }

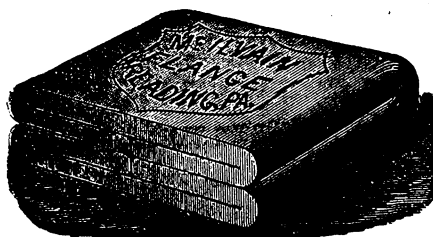
WM. McILVAIN & SONS,

READING, PA.,

MANUFACTURERS OF

IRON AND STEEL

BOILER PLATES.



CAPACITY. { Plates 1 inch thick to No. 12.
30 feet long.
70 inches wide.

Locomotive, Fire Box, Flange, Shell,
Tank Iron and Steel, including Plates for
Bridges, Girders, Stacks, Pipe and Fire
and Burglar-proof Safes.

THE GALLOWAY BOILER.

Safety, Maximum Economy in Fuel, Lowest Cost of Maintenance.
Greatest Durability, Large Steam and Water Spaces.

Are the Advantages Offered by this Boiler.

SPECIFICATIONS AND PRICES UPON APPLICATION TO

EDGE MOOR IRON COMPANY,

Post Office, Wilmington, Delaware.

WILLIAM SELLERS, Pres't. JOHN SELLERS, Jr., Vice-Pres't. H. B. BRADFORD, Supt.
WM. F. SELLERS, Secretary. WILLIAM H. CONNELL, Treasurer.
F. W. HEISLER, Purchasing Agent.



BRASS and BRONZE CASTINGS TO ORDER.

Nickel and Brass Plating.
Light Machinery and Machine Work.
Bronzing and Japanning.

Estimates given and contracts taken for the manufacture of Specialties and Brass Goods
Correspondence solicited.

O. H. ANGUS, Pleasant St., Albany, N. Y.

The Trenton Malleable Iron Company.

MALLEABLE CASTINGS

Made from Refined Air Furnace Iron.

SPECIALTIES: Malleable Iron Castings, Car Couplers, R. R. Supplies, Street Car R. R. Supplies, Car Replacers, Malleable Iron Castings for Contract Work, Frog and Switch Castings, Castings—Light and Heavy, Journal Box Castings, Car Trimmings.

Prices given upon receipt of Patterns or Sample Castings.

Trenton, New Jersey.

ESTABLISHED 1876.
THE SARGENT COMPANY
FORMERLY *The Congdon Brake Shoe Co.*
IRON & STEEL FOUNDERS
59TH & WALLACE STS. CHICAGO.
BRAKE SHOES-STEEL CASTINGS.

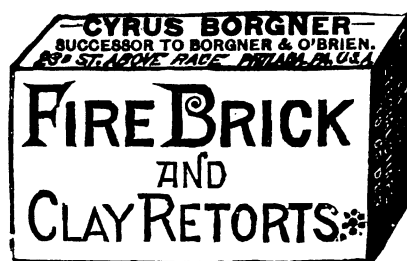
STAY-BOLT,
RIVET, D. LINK,
AXE, HATCHET,
CARRIAGE AND
WAGON AXLE
IRON.

SUPERIOR QUALITY REFINED BAR IRON,
"VULCAN" AND "LOCKHART" BRANDS.



SMALL CHANNELS AND ANGLES,
HEXAGON IRON AND STEEL.

ALL
MERCHANT BAR
SIZES
OF
SOFT
STEEL.



ESTABLISHED 1864.

JAMES GARDNER & SON,

MANUFACTURERS OF

**"STANDARD SAVAGE" FIRE BRICK
TILE and FURNACE BLOCKS**

OF ALL SHAPES AND SIZES.

WORKS, Ellerslie, Allegheny Co., Md.
OFFICE, Cumberland, Md.; P. O. Box 540.

S. M. Hamilton & Co., Agents, - Baltimore, Md.
Stowe, Fuller & Co., Agents, - Cleveland, O.

Established 1848.

OSTRANDER FIRE BRICK CO.

Manufacturers of

FIRE BRICK

**FOR ALL PURPOSES
TROY, N. Y.**

ESTABLISHED 1856

HENRY MAURER & SON,

MANUFACTURERS OF

FIRE BRICK

of all Shapes and Sizes,

420 E. 23d St. New York.

B. KREISCHER & SONS,

FIRE BRICK

BEST AND CHEAPEST,

ESTABLISHED 1846.

Office, foot of Houston Street, East River, NEW YORK.

UNION MINING COMPANY.

MOUNT SAVAGE FIRE BRICK.

Agent for Eastern Penna., West New Jersey and Delaware
EDWARD J. ETTING,
222 South Third St., Philadelphia, Pa.

RENOVO FIRE BRICK & CLAY CO., Limited,

MANUFACTURERS OF

Highest Grades of FIRE BRICK,

Suitable for any purpose when a refractory brick
is required.

Works: Renovo, Pa.

Office: 420 Walnut St., Philadelphia, Pa.

HIGH Presbrey Stove Lining Co.,

GRADE TAUNTON,
MASS.

FIRE BRICK for all purposes.

FRANCIS WISTER,
COMMISSION MERCHANT,
COKE, COAL, ORES.

National Foundry Coke a Specialty.
Sulphur less than 0.5.

All sizes National Crushed Coke.
Bullitt Building, PHILADELPHIA.

MAHONING FOUNDRY & MACHINE SHOP,

BUILDERS OF

Blast Furnaces, Rolling Mill and Mining Machinery,

ROTARY SQUEEZERS, ORE CRUSHERS, ROLL TRAINS, SHEARS, IRON TRUCKS, &c.

Makers of Castings of all descriptions for cable and electric railroads, building fronts, columns, etc. Address

FRANK JAMESON, Manager, Danville, Pa.

**WROUGHT IRON
OPEN HEXAGONAL**



TURNBUCKLES

THE ONLY BUCKLE MADE HAVING A
PERFECT WRENCH HOLD.

MADE ONLY BY

THE CENTRAL IRON & STEEL CO.,



GUARANTEED
STRONGER THAN ANY
SIMILAR ARTICLE ON
THE MARKET.

Also Manufacturers of R. R. SPIKES, BAR IRON and CAR AXLES. **BRAZIL, IND**

EXHAUST TUMBLERS,
Hexagon, Round or Wooden.
BEST AND CHEAPEST.

WM. A. SWEETSER,
89 Montello St., Brockton, Mass.

Patent Tumbling Barrels.

MANY VARIETIES
For all Kinds of Work.
Send for new Catalogue.
HENDERSON BROS., Waterbury, Conn.

STEEL CASTINGS,
True and Solid.
MACHINERY WORK A SPECIALTY.
Correspondence Solicited.
New Castle Steel Casting Co.,
NEW CASTLE, PA.

HENRY AIKEN,
Consulting Mechanical Engineer
Rooms 508 and 509, Lewis Building,
PITTSBURGH, PA.

GRAM CURTIS,
Consulting Mechanical Engineer
Bessemer and Open Hearth Steel Works,
Rolling Mills, Iron Buildings,
Heavy Machinery.
Rooms 612 and 613 Lewis Block,
PITTSBURGH, PA.

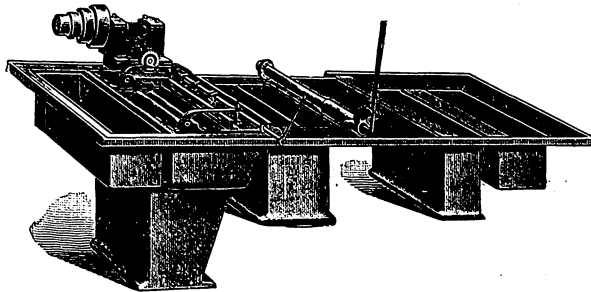
BURGESS & LOXLEY,
MILITARY ROAD & CHANDLER STREET,
BUFFALO, N. Y.

Malleable Iron and Small Steel Castings.

THE LLOYD BOOTH CO.,

**YOUNGSTOWN,
OHIO.**

Tinning
MACHINERY.



Rolling Mills,
Sand and Chill
ROLLS.

FRANKFORD STEEL COMPANY.

FRANKFORD, PHILA., PA.

Steel Railroad and Machine Forgings,

SOLID CRUCIBLE STEEL CASTINGS

AND
Best Grades of Tool and Machinery Steel.

COLD DRAWN STEEL SEAMLESS TUBING



From $\frac{3}{16}$ to $1\frac{3}{4}$ inches in diameter and from
No. 8 gauge to 26. Made from the best
quality of steel, guaranteed perfect and to
stand the severest tests. Reasonable in price.
Address, for samples and prices,
SHELBY, OHIO.

IRON CASTINGS of all kinds to order.

Drill Press and PLANER CHUCKS.

UNIVERSAL PORTABLE RADIAL DRILLS. HIGH PRESSURE VERTICAL ENGINES.
HORIZONTAL STATIONARY ENGINES.

CRANES, Hand and Power, Steam and Hydraulic.

Diamond Pointed Core PROSPECTING DRILLS.

Can Turn 22 Feet Diameter.

MACHINERY of all kinds built to order.

MINERAL LANDS PROSPECTED and Artesian Wells Bored, by Contract.

PENNSYLVANIA DIAMOND DRILL & MANUFACTURING CO. - BIRDSBORO, PA.

CHICAGO MACHINERY & ENGINEERING CO., Western Sales Agents. Chicago, Ill.

Do You
Want Nice,
Bright, Smooth
Castings?

If so, order all

Foundry Facings,
Foundry Supplies,
Foundry Equipments,
East India Plumbago
and Silver Lead from

The S. OBERMAYER CO., Cincinnati, O.

The Largest Foundry Supply House in the World. Write for our Catalogue.

Foundry
Facings

Foundry
Supplies

MANUFACTURERS,

J. W. PAXSON & CO.

Philadelphia, Pa.

GROUND SILICA ROCK,
FIRE BRICK,
FOUNDRY LADLES,
TUMBLING BARRELS.

CORE-COMPOUND.

PEERLESS FACING MILLS.

Foundry Facings, Blackings and Foundry Supplies.
Iron and Brass Foundries Completely Equipped.

**DIRECT IMPORTERS and REFINERS of GRAPHITE, SILVER
LEADS or PLUMBAGO.**

No Charge for Trial Samples.

Send for Illustrated Catalogue and Price-List.

THE CHICAGO FOUNDRY SUPPLY CO., CHICAGO, ILL.

WHITEHEAD BROTHERS COMPANY,

WORKS AT

DEALERS IN

CHEESEQUAKE CREEK, N. J. CEDAR HILL, N. Y.
SOUTH RIVER, N. J. COXSACKIE, N. Y.
RAKITAN RIVER, N. J. CLINTON POINT, N. Y.
SOUTH AMBOY, N. J. ABERNETHY, N. Y.
WARREN, MASS. COEYMAN, N. Y.
CENTRE ISLAND, L. I. WILLOW SPRINGS, N. Y.
WATERFORD, N. Y. POUGHKEEPSIE, N. Y.
ALBANY, N. Y. CRESCENT, N. Y.

**Moulding Sand, Fire Sand, Philadelphia Sand, French
Sand, Fire Clay, Kaolin and Foundry Facings and
Supplies of all kinds. Lead Facings a specialty.**

517 West Fifteenth St., - - - New York.

TO MAKE BRIGHT SMOOTH CASTINGS USE
RADIANT FACINGS
AND
BLACKINGS
MANUFACTURED BY
THE J.D. SMITH FOUNDRY SUPPLY CO.
CINCINNATI, O.
U.S.A.



WESTERN FOUNDRYMEN, SAVE TIME, MAKE MONEY.

Order Facings and Foundry Supplies from
The MacKellar Foundry Facing & Supply Co. Quincy, Ill.

ECONOMICAL
DETROIT GRAPHITE MFG. CO.
GRAPHITE PAINT
DETROIT, MICHIGAN.
SEND FOR CIRCULARS.
DURABLE **INDESTRUCTIBLE**

IRON CHIMNEYS

For all Plants

USING

POWER

ANY SIZE AND
HEIGHT.

COST LESS

AND ARE

STRONGER

AND MORE

DURABLE

THAN

Brick Chimneys.

Prices on application.



Philadelphia Engineering Works, Ltd.

Mifflin and Meadow Sts., Philadelphia, Pa.

Western Branch:
PHOENIX BLDG., CHICAGO, ILL.

A. LEOFRED

(Graduate of Laval & McGill),

MINING ENGINEER,

Head Office: Quebec, Canada.

SHILLING FOUNDRY CO., COLUMBUS, O.

GRAY
IRON CASTINGS

MADE TO
ORDER. SEND
SAMPLES FOR
PRICES.

McCLURE, AMSLER & CO.

Engineers and Contractors,

Bissel Block, Pittsburgh, Pa.

BLAST FURNACE CONSTRUCTION

A SPECIALTY.

General Agents for Massick's and Crook's Patent Fire Brick Stoves; Designs and Estimates for the construction of Blast Furnace Work, and for all kinds of Hot Blast Fire Brick or Pipe Stoves; and all other kinds of Brick Work pertaining to Steel Plants, Iron, Brick or Wooden Buildings, all kinds of Iron Construction in general.

We propose to put into successful operation all the plants we design and contract for.

The Iron-Masters' LABORATORY

Exclusively for the

Analysis of Ores of Iron Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

Branch Office, 339 Walnut St., Philadelphia.

All Analytical Work at Warrenton, Virginia.

J. BLODGET BRITTON

This laboratory was established in 1886, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes, the object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

Artificial Gas Engineering Co.,

Consulting and Contracting

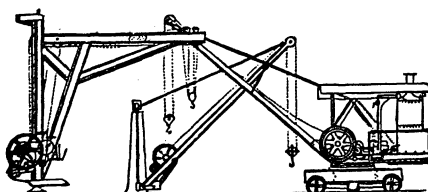
ENGINEERS.

ARTIFICIAL GAS applied to all Branches of Manufacturing and Domestic Uses. Apparatus for the Manufacture Of Coal-Gas Furnished at Lowest Prices.

706 TIMES BUILDING,
PITTSBURGH, PA.

THE ALLENTOWN ROLLING MILLS,
MANUFACTURERS OF

Cranes, Derricks, Etc.,



ALLENTOWN, PA.

THE D. R. LEAN COMPANY

ENGINEERS and CONTRACTORS,

Penn Building, Pittsburgh, Pa.

Blast Furnace and Steel Plant construction. Regenerative Gas Furnaces and Gas Producers.
Sole Agents **FORD & MONCUR'S** Fire Brick Stove, Machinery and Castings, Iron Buildings, &c.

WILKIE, BOTHWELL & CO., Ltd.

Engineers and Contractors. Blast Furnaces and Steel Works.

We make a specialty of Repair Work, and can furnish a full line of Valves and Fittings for Whitwell and Cowper-Kennedy Stoves.

606 Times Building, Pittsburgh, Pa.

ROCK DRILLING AND AIR COMPRESSING

MACHINERY

—FOR—

TUNNELS, QUARRIES,

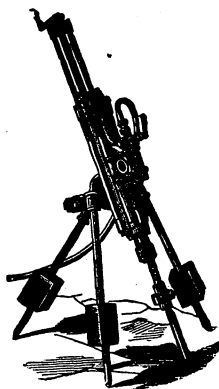
MINES, RAILROADS,

And wherever Ore and Rock are to be Drilled and Blasted.

RAND DRILL CO.,

23 Park Place, New York.

Branch Offices: Monadnock Building, Chicago; Ishpeming, Mich; 1316 18th Street, Denver; Sherbrooke, P. Q., Canada; Apartado 830, Mexico City.



THE COST OF MANUFACTURES

—) AND THE (—

ADMINISTRATION OF WORKSHOPS,

Public and Private.

BY CAPT. HENRY METCALFE.

322 Pages; 6¼ x 9½ inches.

CLOTH, \$5.00

This work is an effort to correct some of the wrong, and consequently unprofitable, methods of conducting manufacturing establishments, and proposes plans for more correct ones. A system of mechanical bookkeeping, based on the card catalogue method, dispensing with the use of books, by which the cost of manufactures may be promptly determined, either in gross or detail, as to component parts and operations thereon. Comprising a simple method of recording all dealings with material which relate to its procurement, expenditure or possession. Applied, with numerous practical illustrations, to the trust, accountability for public property and funds required of the U. S. Ordnance Department, with a review of its present practice. Illustrated with tables, forms of cards, etc.

Any Book Published Sent, Post-paid, on Receipt of the Price, by

DAVID WILLIAMS, Publisher and Bookseller,
96-102 Reade Street, New York.



THE S. R. SMYTHE COMPANY, INCORPORATED.LEWIS BLOCK, **ENGINEERS AND CONTRACTORS.** PITTSBURGH, PA.**Regenerative Gas Furnaces and Gas Producers
For All Purposes.**

TUBE, STEEL, ROLLING MILLS, GLASS WORKS CONSTRUCTION, Etc.

We contract for complete Plants, guarantee results and satisfactory operation of same.

OVER 100 PLANTS IN SUCCESSFUL OPERATION.**JULIAN KENNEDY.****Consulting and Contracting Engineer,**

Rooms 36, 37, 38, 39 Vandergrift Building, Pittsburgh, Pa.

Blast Furnaces, Bessemer and Open Hearth Steel Works, Rolling Mills.

STEAM AND HYDRAULIC MACHINERY, &c.

—Branch Office of The Latrobe Steel Works.—

Wm. Swindell & Bros..**ENGINEERS AND CONTRACTORS,****Regenerative and Recuperative Gas Furnaces for
Steel, Iron and Glass.****SWINDELL'S IMPROVED GAS PRODUCERS,**

243 BUILT SINCE APRIL 1, 1891.

P. O. Box 945.

548 Smithfield St., Pittsburgh, Pa.

ALEX LAUGHLIN & CO.

LEWIS BLOCK, PITTSBURGH, PA.

GAS HEATING
GAS PUDDLING
CRUCIBLE
OPEN HEARTH
TUBE WELDING**FURNACES**AND ARTIFICIAL GAS PRODUCERS OF EVERY
DESCRIPTION, FOR ROLLING MILLS, STEEL AND TUBE WORKS.
We guarantee to place all plants erected by us in successful operation.**J. A. HERRICK, M. E.,****Consulting Engineer and Contractor.**

Room 609, 284 Pearl Street, NEW YORK.

—**STEEL CASTING PLANTS A SPECIALTY.**—

Melting and Heating Furnaces of ALL KINDS.

Patent Gas **WATER VALVES.** Improved "BASIC" and "SEMI-STEEL" Processes and **FURNACES.**New **CONTINUOUS** Gas PRODUCERS.**HENRY J. CARTEN,****ENGINEER AND CONTRACTOR,****REGENERATIVE GAS FURNACES AND ARTIFICIAL GAS PRODUCERS,**

Room 15, Stevenson Building, Pittsburgh, Pa.,

Special attention given to Gas producer plants not working satisfactorily.

CORRESPONDENCE SOLICITED.**OIL WELL SUPPLY COMPANY**

OWNERS OF THE

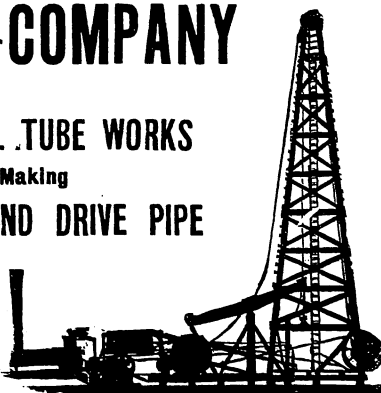
ELBA IRON WORKS, CONTINENTAL TUBE WORKS

And Six Other Manufactories Making

WROUGHT IRON STEAM, LINE AND DRIVE PIPETubing, Casing, Boilers, Engines, Drilling Rigs,
Tools, Rope,And all other appliances necessary for drilling Oil, Gas
and Water **ARTESIAN WELLS.**

PITTSBURGH, OIL CITY AND BRADFORD, PA.

Also 32 CORTLANDT STREET, NEW YORK

**BOOKS**

—ON—

**Mechanical and Steam
Engineering.****Mechanic's, Millwright's and
Engineer's Pocket Com-
panion.**With American additions. By W. TEMPLE-
TON. Leather; tuck\$2**Steam and Machinery Manage-
ment.**A guide to the arrangement and economical
management of machinery, with hints on
construction and selection. By M. POWIS
BALE, M. Inst. M. E., A. M. Inst. C. E. 191
pages; cloth.....\$1**Richards' Steam Engine Indi-
cator.**A treatise on the development and appli-
cation of force in the steam engine. Fourth
edition, revised and enlarged. By C. T.
PORTER. 273 pages; 20 plates; cloth.....\$3**Thermo-Dynamics, Heat Motors,
and Refrigerating Machines**By PROF. DE VOLSON WOOD. Third edition,
revised and enlarged; 452 pages; cloth....\$4**Mechanics' and Engineers'
Pocket Book.**By CHAS. H. HASWELL. Fifty-fifth edition;
956 pages; leather.....\$4**Steam Boiler Explosions in The-
ory and Practice.**By Prof. R. H. THURSTON. Second edition
illustrated; cloth.....\$1.50**Manager's Hand-Book of
Modern Rules,**Tables and Data for Civil and Mechanical
Engineers, Millwrights and Boiler Makers,
Tool Makers, Machinists and Metal Worker's
Iron and Brass Founders, &c. By W. S.
HURTON. Thick 8vo, half-bound.....\$6**A Manual of Steam Boilers,**their designs, construction and operation.
For technical schools and engineers. By
PROF. R. H. THURSTON. Second edition;
183 engravings in text; 671 pages; cloth..\$5**Treatise upon Cable or Rope
Traction,**as applied to the working of street and other
railways. Revised and enlarged from *En-
gineering*, London. By J. BUCHNALL SMITH.
Illustrated; 195 pages; cloth.....\$2.50**Complete Practical Machinist.**By JOSHUA ROSE. Embracing lathe work,
vise work, drills and drilling, taps and dies,
hardening and tempering, the making and
use of tools, &c. Fifteenth edition; 356
illustrations; 430 pages.....\$2.50**The Car Builder's Dictionary.**An illustrated vocabulary of terms, which
designate American railroad cars, their
parts and attachments. Revised and en-
larged edition. By MATTHIAS N. FORNEY,
M.E.; 358 pages; cloth.....\$3**Engineers' Sketch Book.**By THOMAS WALTER BARBER, engineer.
Nearly 2000 illustrations, descriptive notes
and memoranda; 243 pages; cloth.....\$3**Locomotive Engine Running
and Management.**A practical treatise on the locomotive en-
gines, showing their performance in running
different kinds of trains with economy and
dispatch; also directions regarding the care,
management and repairs of locomotives
and all their connections. Illustrated by
numerous engravings. Seventeenth edition.
By ANGUS SINCLAIR, M.E. Cloth.....\$2**Modern American Locomotive
Engines,**their Design, Construction and Manage-
ment. A practical work for practical men.
By EMORY EDWARDS, M.E. Illustrated by
78 engravings; 383 pages; cloth.....\$2*Any Book published sent, post-paid, upon
receipt of price, by***DAVID WILLIAMS,**

Publisher and Bookseller,

96 - 102 Reade St., New York.

James Hemphill. PRESIDENT.
Wm. H. Conley. TREASURER.
Thos. B. Riter. VICE PRESIDENT.
Jno. F. Wilcox. GEN'L. MANAGER.

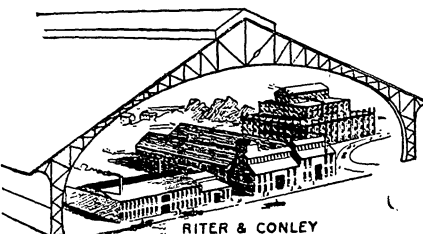

Pittsburgh Iron & Steel Engineering Co.

LEWIS BLOCK
Pittsburgh
Pa.
U.S.A.

BESSEMER & OPEN HEARTH STEEL PLANTS.

BRIDGES, GIRDERS, IRON BUILDINGS.

ROLLING MILLS
(BLOOMING, RAIL, PLATE &c)

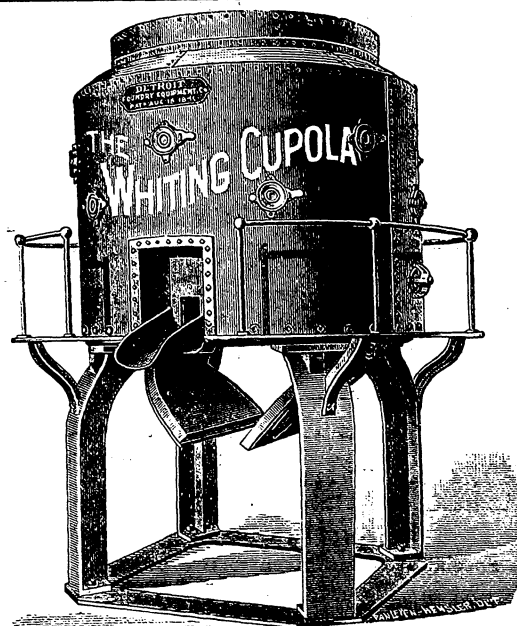
BLAST FURNACES,
ENGINES, BOILERS.

WORKS BUILT COMPLETE

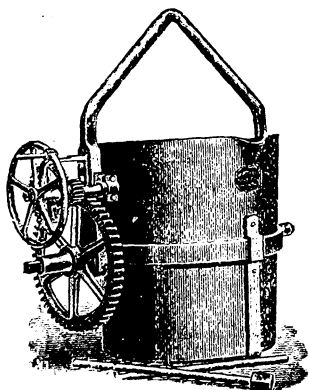
AND FULLY EQUIPPED
FOR OPERATING.

This is what they say about it:

- "Your Cupolas have given us entire satisfaction."
- "We cannot recommend it highly enough."
- "It has fulfilled all claims."
- "We need hot, fluid iron, and have no trouble getting it with your Cupola."
- "The best we have ever used."
- "Your Cupolas have given the best of satisfaction, and we give them our endorsement."
- "We are well satisfied; the iron comes sharp, and keeps the men busy."
- "It fills the bill."
- "Melting over ten to one, and have very hot iron."
- "We are well pleased with it. It saves our coke bills and lining."
- "Melting over ten to one. Quality of castings excellent."
- "All you claim for it."
- "Satisfactory in every particular."



The Whiting Patent Cupola.



Write for copies of above letters, together with circulars, to the sole makers and patentees,

Detroit Foundry Equipment Co.,

MICH. AVE. & D. & B. C. R. R. **Detroit Mich.** Or 702 & 703 TEMPLE COURT, CHICAGO.

Designers and Builders of Improved

**Cranes, Whiting Improved Car Wheel Foundry Plant, Ladles, Tumblers,
AND COMPLETE FOUNDRY OUTFITS.**

We would be pleased to see you at the new Foundryman's Exchange when you are in Chicago. The rooms are 702-703 Temple Court, 225 Dearborn St. Call and make yourself at home.

ZUCKER & LEVETT CHEMICAL CO.,
 10, 12 & 14 Grand Street, New York, U. S. A.
NICKEL PLATING OUTFITS,
 Dynamos and Motors for Light, Power and Electro-plating.
 Send for Catalogue of
 NICKEL AND ELECTRO-PLATING SUPPLIES AND POLISHING MATERIAL.

THE AERATED FUEL CO.'S SYSTEM

Gives the best oil fire. 200 plants in use, for 50 varieties of work. Forging and tempering a specialty. Send for catalogue to W. S. COLLINS, 45 and 46 Drexel Bldg., New York.

GILBERT & BARKER MFG. CO., General Agents for the U. S., Springfield, Mass.

C. & C. ELECTRIC MOTORS AND DYNAMOS

Highest Electrical Efficiency.

Best Mechanical Construction.

Electric Pumps, Hoists, Fans, Blowers, Etc.

Large experience in and special attention paid to electrical transmission of power in factories.

THE C. & C. ELECTRIC MOTOR CO.

GENERAL OFFICES:

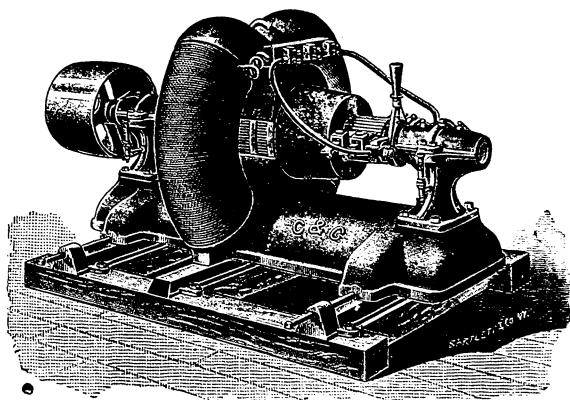
402 and 404 Greenwich St., New York.

BRANCH OFFICES:

CHICAGO,
201 Madison Street.

BOSTON,
63 Oliver Street.

AGENCIES IN ALL PRINCIPAL CITIES.



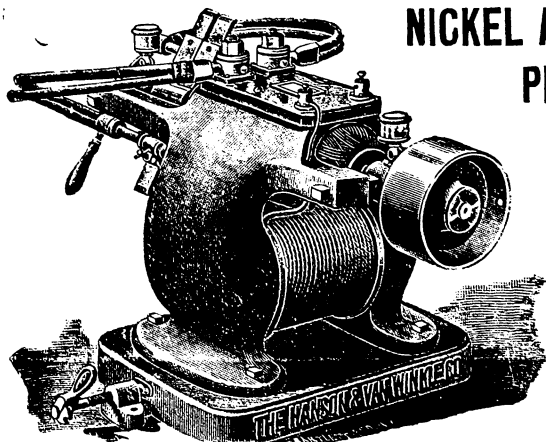
ESTABLISHED 1820.

INCORPORATED 1891

The Hanson & Van Winkle Co.,

MANUFACTURERS OF

NICKEL AND ELECTRO PLATERS' MATERIAL.



Nickel-Plating Outfits
From \$20 upward.
DYNAMO - ELECTRO MACHINES

For all purposes.

The New H. & V. W. Dynamo Machine.

In sizes from No. 1 to No. 5.

FROM \$100 TO \$500.

These machines will be placed on 30 days' trial with responsible parties, and if not satisfactory may be returned at our expense. Guaranteed 30% more powerful than any machine in the market at same price.

219-221 Market St., Newark, N. J.

81 Liberty St., New York.

35-37 South Canal St., Chicago, Ill.

WE FURNISH EVERYTHING.

The Improved WHARTON-HARRISON SAFETY BOILER,

For all Power and Heating Purposes.
Single Boilers 2-240 H.-P.
Batteries of any Capacity.

THE COCHRANE
FEEDWATER HEATER.

THE COCHRANE
FEEDWATER HEATER & PURIFIER.

THE COCHRANE

SEPARATOR.

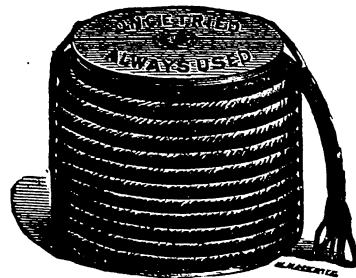
Horizontal or Vertical Form. For Obtaining
Dry Steam. Purified Exhaust.

MANUFACTURED BY

HARRISON SAFETY BOILER WORKS,
Germantown Junction. PHILADELPHIA, PA.



Do not buy before
corresponding
with us.



Send for a Sample of
Morrison's Patent Self-Lubricating Packing,
ROBT. MORRISON,
5034 Arsenal St., St. Louis, Mo

High Pressure Boilers for Electric Light and Power Plants



THOROUGH INSPECTIONS

And Insurance against loss or damage to property and loss of life and injury to persons caused by

Steam Boiler Explosions

J. M. ALLEN, Pres. WM. B. FRANKLIN, Vice-Pres. F. B. ALLEN, 2d Vice-Pres. J. B. PIERCE, Sec. and Treas

BOARD OF DIRECTORS:

J. M. ALLEN, President.
FRANK W. CHENEY, of Cheney Brothers Silk Manufacturing Co.
CHARLES M. BEACH, of Beach & Co.
DANIEL PHILLIPS, of Adams Express Company.
RICHARD W. H. JARVIS, President Colt's Fire Arms Manufacturing Co.
THOMAS O. ENDERS, of the United States Bank.
LEVERETT BRAINARD, of the Case, Lockwood & Brainard Co.
GEN. WM. B. FRANKLIN, late Vice-President Colt's Pat. Fire Arms Mfg. Co.
NELSON HOLLISTER, of the State Bank, Hartford.

HON. HENRY C. ROBINSON, Attorney at Law, Hartford.
HON. FRANCIS B. COOLEY, of the National Exchange Bank, Hartford, Conn.
A. W. JILLSON, late Vice-Prest. Phoenix Fire Insurance Co., Hartford, Conn.
EDMUND A. STEADMAN, President of the Fidelity Co., Hartford, Conn.
GEORGE BURNHAM, Baldwin Locomotive Works, Philadelphia.
HON. NATHANIEL SHIPMAN, Judge U. S. Circuit Court.
C. C. KIMBALL, Prest. Smythe Manufacturing Co., Hartford, Conn.
PHILIP CORBIN, of P. & F. Corbin, New Britain, Conn.

HAVE YOU EXHAUST STEAM? GOING TO WASTE?

Patentees, Proprietors and Manufacturers of the
Webster Vacuum Feed Water Heater and Purifier.
SEND FOR CATALOGUE.

Are your FEED WATER HEATERS obtaining the best results, in heating and purifying the feed water for your boilers? Are you heating your buildings with live steam or exhaust?

IF YOU DESIRE TO GET BETTER RESULTS from your present feed water heaters, and to heat your building by exhaust steam, without back pressure upon engines, saving power and water of condensation, together with **GREATER ECONOMY IN FUEL**, send for our catalogues of **Webster Vacuum Feed Water Heater and Purifier, and Williams Vacuum System of Steam Heating**, which contains some of the largest plants in the United States as references. We visit plants in any part of the United States, at our expense, furnish our apparatus, which may be attached to your present plant, upon trial, under guarantee.

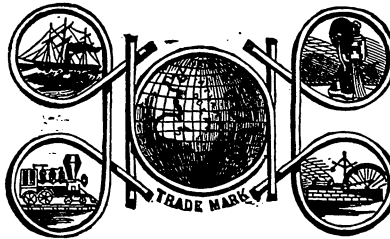
WARREN WEBSTER & CO.,

Managers and Sole Licensees for the Sale of Patent Rights in the United States.

Main Office and Works, 491 N. 3d St., PHILADELPHIA.

GLOBE PACKING.

FOR STEAM ENGINES, PISTON RODS,
MINING PUMPS,
HYDRAULIC LIFTS. ICE MACHINES, ETC.



None genuine without this TRADE-MARK on the MUSLIN cover.

AGENCIES:

The Burnet Co., New York; W. D. Allen & Co., Chicago; Ensign & McGuffee, San Francisco; T. K. Carey & Bro., Baltimore; Charlotte Supply Co., Charlotte; Waters & Garland, Louisville; Southern R. & Supply Co., Richmond, and others

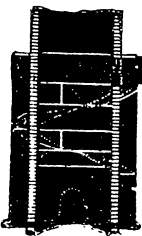
Ask your supply dealers for it or order from agencies or from makers,

JAS. H. BILLINGTON & CO.
PHILADELPHIA, PA.

VICTOR COLLIAU,

Sole builder of his

New and Improved Patented



**HOT-BLAST
Colliau Cupola,**

287 Jefferson Ave.,
DETROIT, MICHIGAN,
U. S. A.

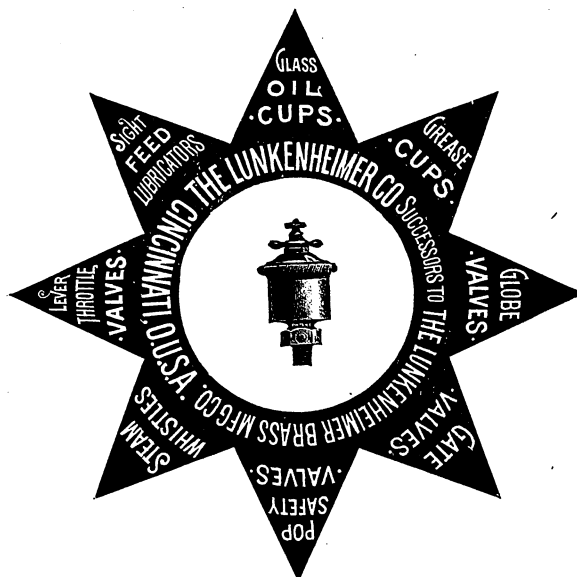
Frank C. Roberts & Co.,
CIVIL ENGINEERS.

Blast Furnaces, Steel Works, Rolling Mills, Iron and Steel Bridges and Buildings, Factory and Warehouse Construction.

OFFICES:

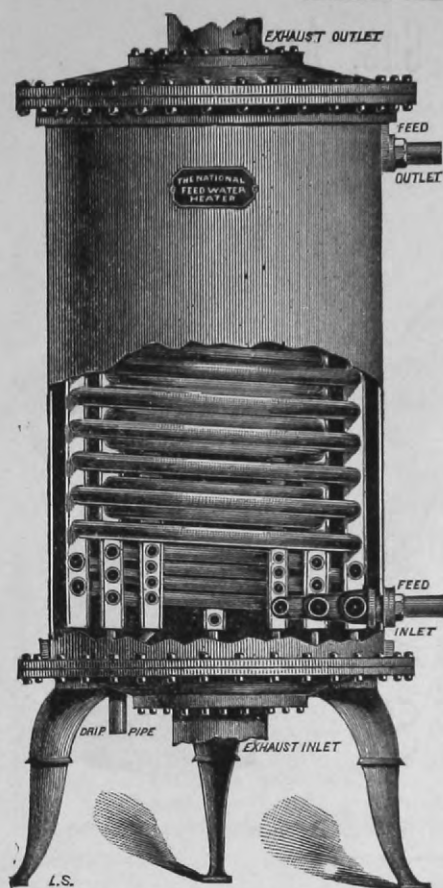
S. E. Cor. 4th and Chestnut Sts., Philadelphia, Pa.

VULCAN IRON WORKS
CHICAGO
PILE DRIVERS



The National Feed-Water Heater,

Delivering Water to the Boiler at 210° to 212°.



Over 400,000 Horse-Power in Use, and Satisfaction Universal.

18 Sizes Manufactured.

From 8 to 2000 Horse-Power.

Prices Low and Every Heater Guaranteed

Catalogue with list of users furnished on application.

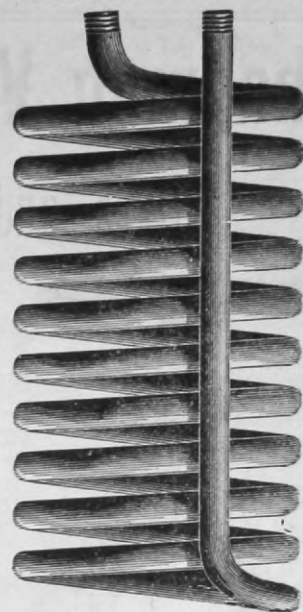
ALSO MAKERS OF

Coils and Bends of Iron,
BRASS AND COPPER PIPE.

—ALL STYLES.—

THE NATIONAL PIPE
BENDING CO.,

98 River St., New Haven, Conn.

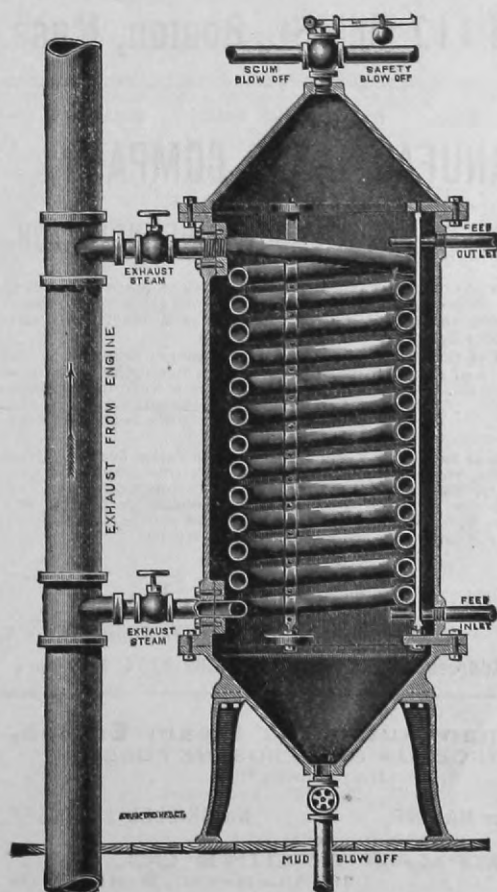


SPIRAL COIL.



FLAT COIL—CLOSE.

The American Feed Water Heater.



The result of over 14 years' experience in the manufacture of various styles of heaters. We use only best seamless

Copper Tubing.

The construction is such that there are

No Joints

inside of the shell, consequently there are

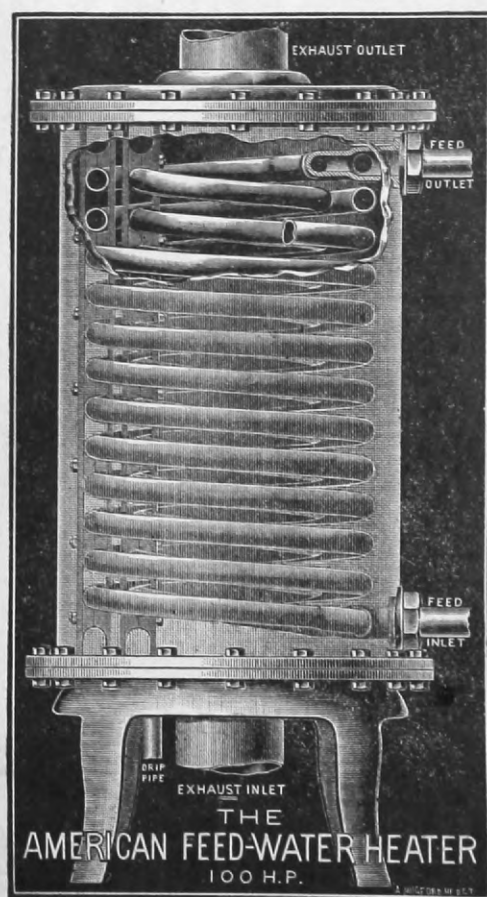
No Leaks.

Send for Catalogue.

THE
Whitlock Coil Pipe Co.

MANUFACTURERS,
27 South St., Elmwood, Conn.

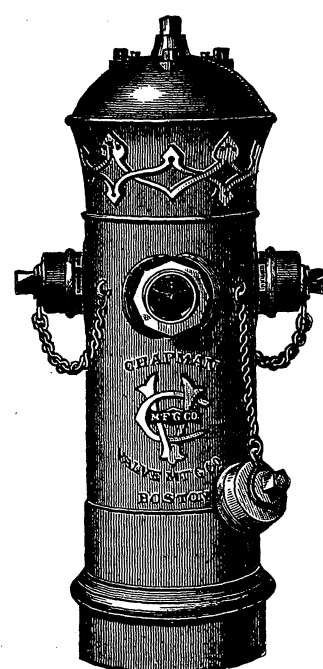
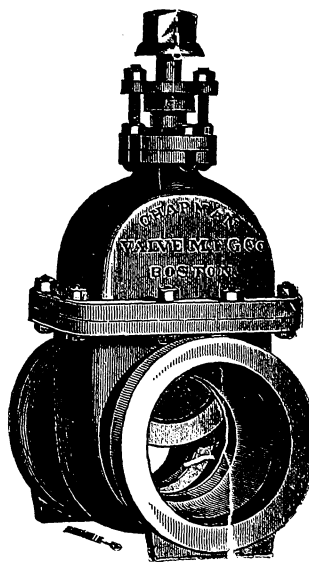
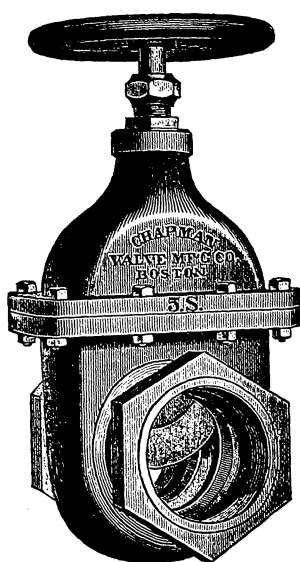
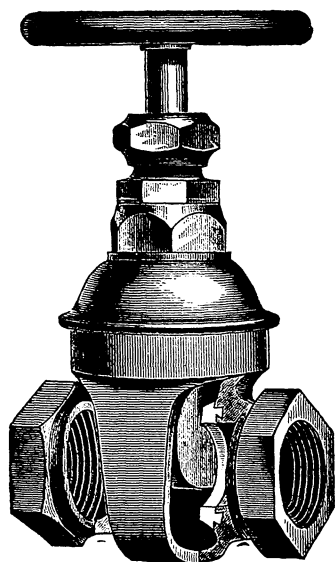
NEW YORK OFFICE.
Mail and Express Building, 164 and
168 Fulton St., Room 404,
JNO. J. FINNELL, Manager.
JARVIS ENGINEERING CO., Agents for
New England.



Chapman Valve Manufacturing Company,

MANUFACTURERS OF

Valves and Gates for Steam, Water, Gas, Ammonia.



GATE FIRE HYDRANTS,

With and Without Independent Nozzle Valves.

Valves and Hydrants made with Babbitt Metal Seats and non-corrosive working parts. **All work guaranteed.** Send for Price List.

WORKS AND GENERAL OFFICE:

INDIAN ORCHARD, MASS.

TREASURER'S OFFICE:

72 Kilby and 112 Milk St., Boston, Mass.

THE AMERICAN STEAM ENGINEER.

Theoretical and Practical, with examples of the latest and most approved American practice in the design and construction of Steam Engines and Boilers.

For the use of engineers, machinists, boiler-makers and engineering students.

By EMORY EDWARDS M.E., author of "A Catechism of the Marine Steam Engine," "Modern American Locomotive Engines," "Modern American Marine Engines, Boilers and Screw Propellers," and "The Practical Steam Engineer's Guide."

Fully illustrated. About 350 pp.

12mo, \$2.50

Sent, postpaid, on receipt of price by

DAVID WILLIAMS.

Publisher and Bookseller,

96-102 Reade St., New York

E. L. MAXWELL, Pres.

C. A. MOORE, Vice-Pres.

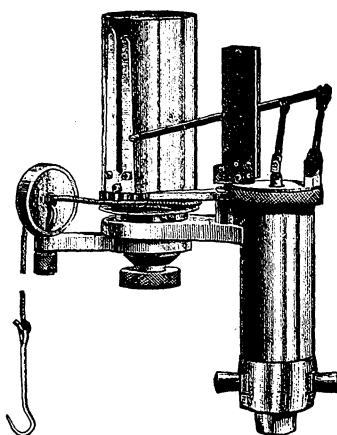
H. S. MANNING, Treas.

M. LUSCOMB, Sec

THE ASHCROFT MANUFACTURING COMPANY,

SOLE MANUFACTURERS OF

THE TABOR STEAM ENGINE INDICATOR.



The only instrument that will make accurate diagrams at either high or low speeds. In use all over the World where accuracy is desired. Approved and adopted by United States Government on the new Cruisers.

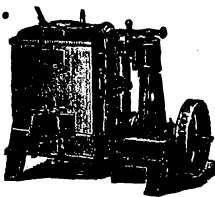
Use the Coffin Averaging Instrument; determines the area of any irregular figure. Gives mean effective pressure (M. E. P.) of an indicator diagram without computation. Absolute accuracy. Easy to manipulate. No liability to error. One diagram per minute measured without effort.

Also Steam and Vacuum Gauges, with Patent Seamless Drawn Tube, Steam Traps, Packer Ratchet Drills, Stanwood Cutters, Marine Clocks, Engine Revolution Counters, Test Gauges, Oil Cups, Test Pumps, Locomotive Spring Balances, Steam Whistles, Salinometers, and all instruments for Measuring Steam, Air, Gas, or Water.

Office and Salesroom, 111 Liberty St., N. Y.

Factory, Bridgeport, Conn.

Address all Letters to P. O. Box 3754, New York.



The Shipman Automatic Steam Engine. PETROLEUM OR KEROSENE FUEL.

1, 2, 6, 8 Horse-Power, Single.
8 and 22 "Compound.

STATIONARY or MARINE.

No SKILLED ENGINEER.

—SEND FOR CATALOGUE—

SHIPMAN ENGINE CO.,

200 Summer St., Boston, Mass.

New Orleans,

New York,

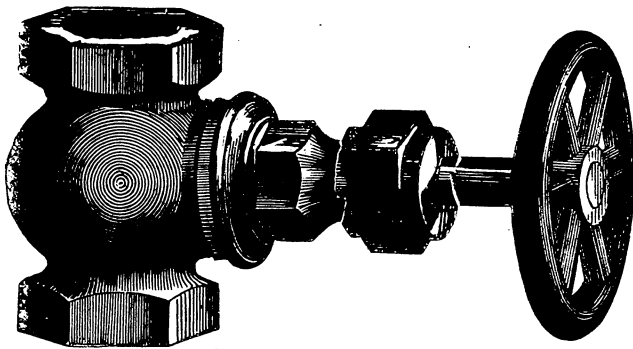
Chicago,

San Francisco.

**BLAST FURNACES,
ROLLING MILLS,
STEEL WORKS,
MINES, ETC.,
ETC.**



**OIL WELLS,
REFINERIES,
ELECTRIC LIGHT PLANTS
WATER WORKS, ETC.,
ETC.**



McNAB & HARLIN MFG. CO.,

—MANUFACTURERS OF—

Brass Cocks and Valves

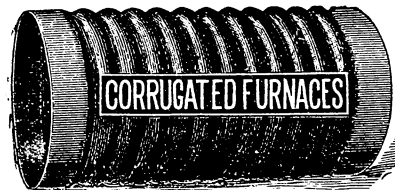
For Steam, Water and Gas.

Wrought Iron Pipe and Fittings. Plumbers' Materials.

SEAMLESS BRASS AND COPPER TUBES.

Factory, PATERSON, N. J. - 56 JOHN ST., N. Y.

Catalogue and Price List will be sent to the Trade with their first order, or by express, if desired before ordering.



THE CONTINENTAL IRON WORKS.

West and Calyer Streets, BROOKLYN, N. Y.,

—SOLE MANUFACTURERS OF—

CORRUGATED FURNACES, FOR MARINE AND LAND BOILERS.

Made in sizes from 28 in. to 60 in. diameter, with flanged or plain ends.

Take Ferry from East 10th or 23d Streets, N. Y., to Greenpoint.

Thos. F. Rowland, Pres.
Thos. F. Rowland, Jr., Treas.

Warren E. Hill,
Chas. H. Corbett, } Vice-Pres.

**TO OBTAIN DRY STEAM
PLACE A
STRATTON SEPARATOR**

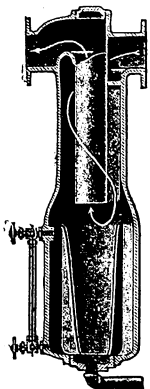
In Your Steam Pipe.

Over 400,000 Horse Power in use.

This is the only apparatus that automatically separates water from steam, and secures the maximum of Economy, Efficiency and Safety. These Separators are used by the U. S. Navy, by the leading Electric Light Cos., Sugar Refineries, Paper Mills, Water Works, Railroads and Steam Vessels. Steam Chimneys or Drums are unnecessary when this Separator is used.

Send for our new publication, "Dry Steam the Foundation of Economy." Sent free on application.

The GOUBERT MFG. CO., Sole Mfrs., 32 Cortlandt St., New York.



**The "Berryman"
Feed Water Heater
and Purifier.**

It never leaks, and hence requires no repairs.

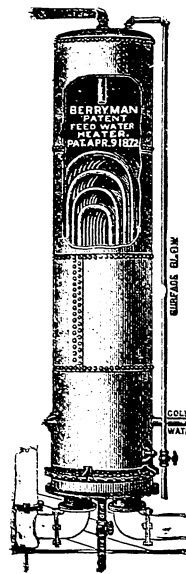
Over 13,000 in use. Apply for Prices, Catalogue and Particulars to

Jas. Berryman, M. E.,

General Manager,

125 N. 4th Street,

PHILA., PA.



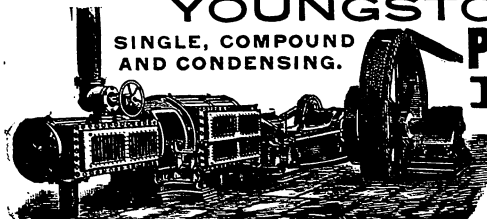
**WILLIAM TOD & CO.
YOUNGSTOWN, OHIO.**

**SINGLE, COMPOUND
AND CONDENSING.**

**PORTER-HAMILTON
ENGINE**

**Blowing Engines,
Hydraulic Cranes & Accumulators
Heavy Special Machinery.**

ENGINE CATALOGUE ON APPLICATION.

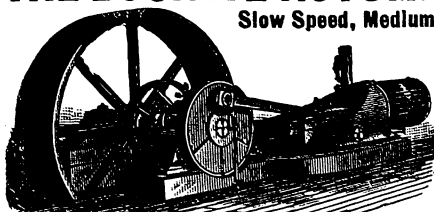


**THE BUCKEYE AUTOMATIC CUT-OFF ENGINES.
Slow Speed, Medium Speed and High Speed Engines.**

**Simple, Compound and Triple Expansion
Engines, High Pressure Boilers.**

**Complete Steam Power Plants of
Highest Attainable Efficiency.**

Address **BUCKEYE ENGINE CO., Salem, Ohio.**



H. T. Porter, No. 10 Telephone Building, New York City. A. A. Hunting, John Hancock Building, Boston, Mass. N. W. Robinson, No. 97 Washington St., Chicago. Robinson & Cary Co., St. Paul, Minn. A. J. Fish, No. 61 First Street, San Francisco, Cal. A. M. Morse, 511 Commercial Building, St. Louis, Mo.

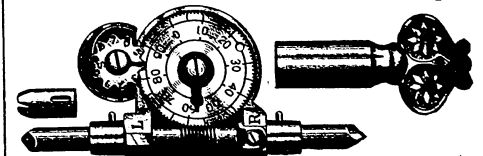
BOSTON GEAR WORKS

37 Hartford St., Boston, Mass.

HEADQUARTERS FOR GEARS.

Book on Gears, 170 Illustrations, \$1.00. Job Gear Cutting of all kinds. Spur, Bevel, Spiral, Ratchet, Worm, Rack, Elliptic, Index Plates, &c. Very small or large. Send for 1892 Catalogue; 900 sizes of Gears; FREE to any business firm.

**CHURCH'S DOUBLE AND SINGLE
SPEED INDICATORS.**



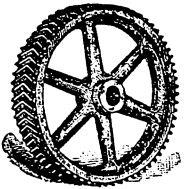
CHURCH & SLEIGHT, 109 FULTON ST., N. Y.

THE TRUEST TEST

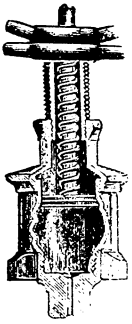
of merit is satisfaction expressed after a trial. We have letters of praise from all who use our **machine molded gear wheels** made from **special process charcoal iron**. We want you to be among the satisfied. Write us for further information.

UNION FOUNDRY & MACHINE CO.,

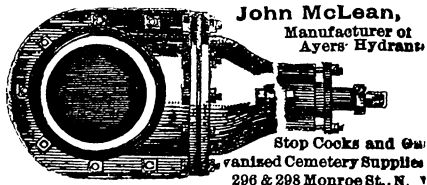
Pittsburgh, Pa.



WADHAM'S OIL AND GREASE CO.,
Milwaukee, Wis.,
Manufacturers of
Fine Lubricants and Compression Grease Cups.



Sole manufacturers of the **O'CONNELL GREASER**. The most reliable lubricator in existence for the Crank Pin and Cross Head. It saves 50 per cent. of the cost of using oil and effectually prevents hot journals. Special cups made for upright **MARINE ENGINES**. Write for Descriptive Catalogue and Prices.



John McLean,
Manufacturer of
Ayers' Hydrants

Stop Cocks and General
Sanitized Cemetery Supplies
296 & 298 Monroe St., N. Y.

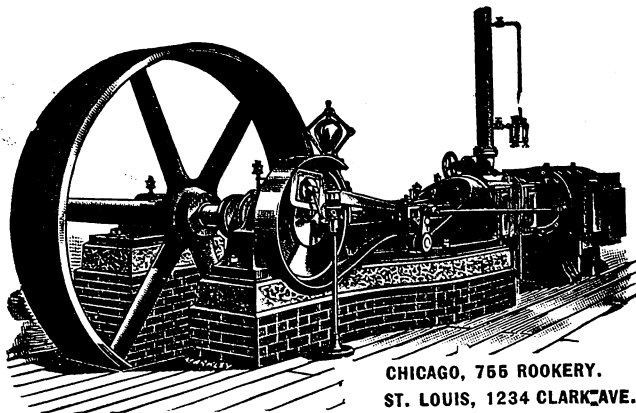
Phoenix Iron Works Company,
MEADVILLE, PENNA.

— MANUFACTURERS OF —

BOILERS

15 Cortlandt St., New York.

48 Chamber of Commerce, Chicago.



**SOUTHWARK
FOUNDRY AND
MACHINE CO.,**

Philadelphia, Pa.

Sole Makers of

**THE PORTER-ALLEN
AUTOMATIC ENGINE,**
SIMPLE, COMPOUND
OR TRIPLE EXPANSION.

Also Builders of

**BLOWING ENGINES,
REVERSING ENGINES,
CENTRIFUGAL PUMPS,
BOILERS, TANKS, ETC.**

CHICAGO, 755 ROOKERY.
ST. LOUIS, 1234 CLARK AVE.

POWER FROM GASOLINE.

DIRECT FROM THE TANK.

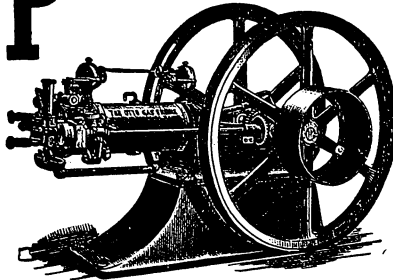
CHEAPER THAN STEAM.

No Boiler. No Steam. No Engineer.

For Use Everywhere.

OTTO GASOLINE ENGINES,
Stationary or Portable.

1 to 50 H. P. 8 to 20 H. P.



Running Expenses, Less than one cent per horse power per hour.

For large engines, one-half cent per horse power per hour.

Suitable for all manufacturing purposes, Electric Lighting, Town Water Supply.

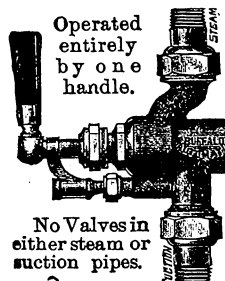
The Best Auxiliary Power for Night Workers.

OTTO GAS ENGINE WORKS,

33d and Walnut Sts.,
PHILADELPHIA, PA.

CHICAGO OFFICE:
151 Monroe St.

BOSTON OFFICE:
19 Pearl St.



BUFFALO AUTOMATIC INJECTOR

A GRADING INJECTOR.

Construction and operation is such that water supply is always in proportion to supply of steam admitted and can be graded to feed continuously with steam from 20 to 140 pounds. Works perfectly whether lifting or taking supply from city pressure. Operated entirely by one handle, both in stopping and starting and grading supply of steam and water.

EAGLE EJECTORS, DUPLEX FLUE SCRAPERS, FELTSCHEN GAUGE-COCKS, IMPROVED GLASS OIL CUPS AND LUBRICATORS, CYLINDER OIL PUMPS, COMPRESSION GREASE CUPS, Etc. Send for Catalogue. Mention this Paper.

SHERWOOD MFG. CO., Buffalo, N. Y.

Operated entirely by one handle.

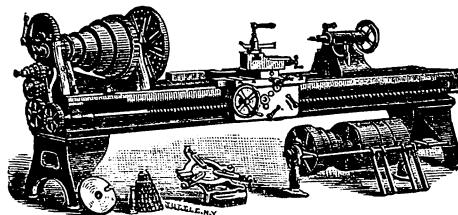
No Valves in either steam or suction pipes.

JOSEPH B. REED, MANUFACTURER OF

IRON WORKING MACHINERY

For Railroads and General Machine Shop Use.

Engine Lathes, Planers, etc.



Lathes from 16 to 30 inch swing, combining all the latest and best improvements of the day, capable of turning out 25 per cent. more good work than most tools on the market. Sold to responsible parties on trial at 25 per cent. below price charged for inferior tools. Send for testimonials, prices and discounts before purchasing elsewhere, and save your money. Address

JOS. B. REED, - - - Cairo, Ill.

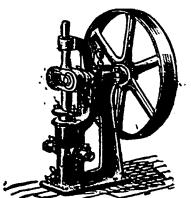
POWER BOILER FEED PUMP.

From 2 to 80 horse-power. Neat in design. Self-contained easy motion. Durable and reliable. Strong built, large bearings.

Send for Catalogue and Prices and mention this paper.

C. O. LUCAS & CO.,

Greenville, Ohio.



Awarded the Grand Prize at Late Paris Exposition.

SEND FOR THIS BOOK *FREE ON APPLICATION.*

THE BABCOCK & WILCOX CO. WATER TUBE

30 CORTLANDT ST. N.Y.

BRANCH OFFICES:
 BOSTON, MASS. 8 OLIVER ST.
 PHILADELPHIA, PA. 32 N. 5TH ST.
 PITTSBURGH, PA. 408 LEWIS BLOCK
 CLEVELAND, O. 412 PERRY-PAYNE BLDG.
 CHICAGO, ILL. 45 S. JEFFERSON ST.
 MINNEAPOLIS, MINN. 604 CORN EX.
 NEW ORLEANS, LA. 57 CAROLINE ST.
 HAVANA, CUBA. 116 1/2 CALLE DE LA RIZADA.

STEAM BOILERS

MANUFACTORIES IN UNITED STATES, SCOTLAND, FRANCE, GERMANY & AUSTRIA.

R. POOLE & SON CO.

SHAFTING, PULLEYS, MACHINERY, FLY WHEELS, FERTILIZER MACHINERY, WATER-WHEEL, GEARING, FACILITIES FOR HEAVIEST WORK, BALTIMORE, MD., U.S.A.

POOLE-LEFFEL, CABLE DRIVING MACHINERY, POWER TRANSMISSION, HANGERS, COUPLINGS, BRASS ROLLING MILLS, MACHINE MOLDED.

THE BERRYMAN AND THE HIGHEST

THE BERRYMAN AND THE HIGHEST

I. B. DAVIS MAKERS

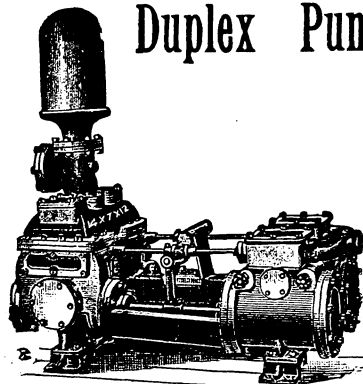
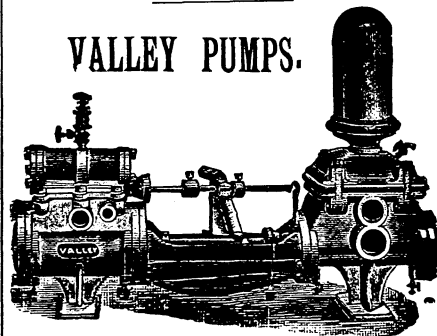
FEED WATER PURIFIER GRADE ONLY

AND SON

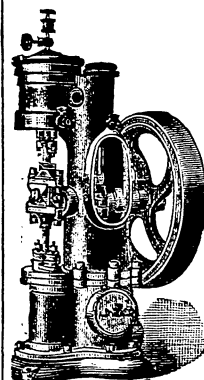
HARTFORD, CT.

PROVIDED WITH U SHAPED TUBES IT NEVER LEAKS

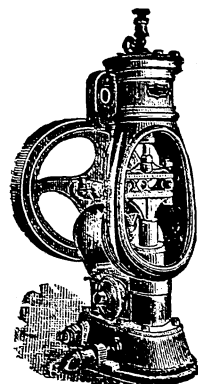
SEND FOR CATALOGUE A.

Duplex Pumps.**VALLEY PUMPS.****ACME****Steam Pumps**

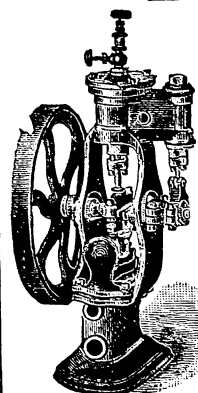
For Feeding Boilers or forcing water against heavy pressure.

**BUCKET PLUNGER**

Steam Pumps for feeding Boilers, filling Tanks, or Fire purposes.

**A. B. C.****Steam Pumps**

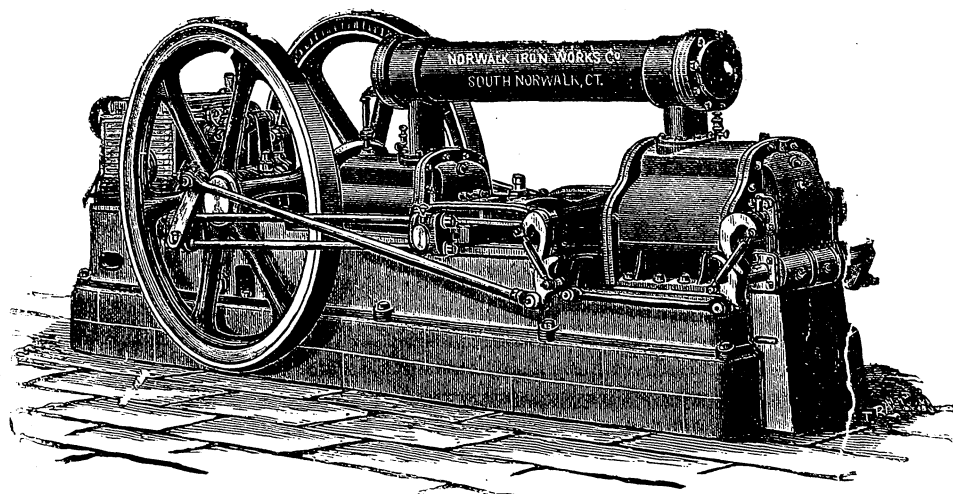
The best low price pump in the world.

**VALLEY PUMP WKS.**

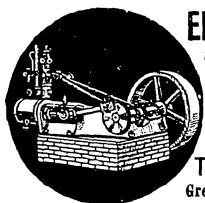
EASTHAMPTON, MASS.

Chicago Agency: 15 So Canal St.

Air Compressors.



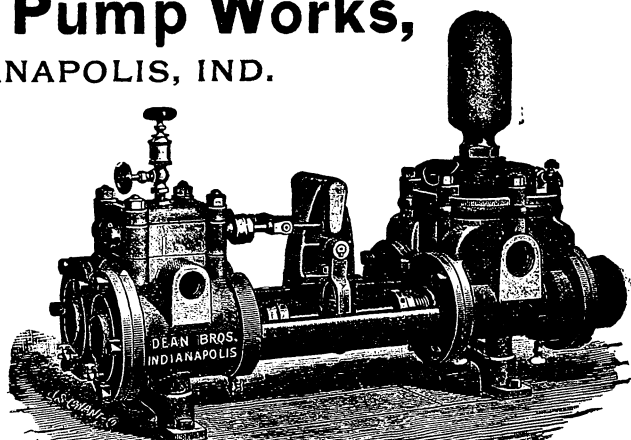
THE NORWALK IRON WORKS CO., South Norwalk, Conn.



ENGINES & BOILERS
Stationary & Semi-Portable
8 to 25 HORSE-POWER.
High in Grade.
Low in Price
Send for Pamphlet.
The **W. C. LEFFEL CO.**
Greenmead Ave., Springfield, O.

DEAN BROTHERS'
Steam Pump Works,
INDIANAPOLIS, IND.

DUPLEX PUMPS.
—
SINGLE PUMPS.
—
DEEP WELL PUMPS.



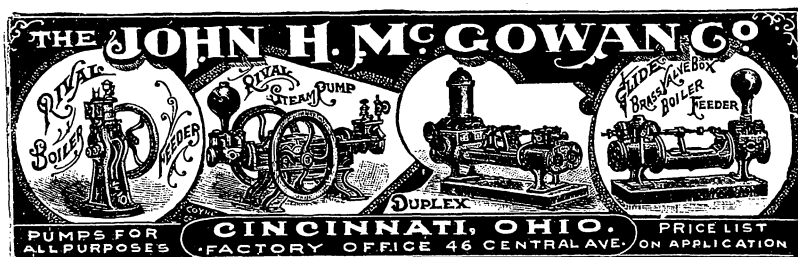
Send for Catalogue
and Prices.

BEVEL GEARS
PLANED PERFECTLY BY PATENTED PROCESS
GLEASON TOOL CO.
ROCHESTER, N. Y.

WELL MACH'Y
All Kinds, Water, Gas, Oil Mining, Ditching, Pumping Wind and Steam; Heating Boilers, &c. Will pay you to send 25c. for Encyclopedia of 1500 Engravings.
The American Well Works, Aurora, Ill.
Also Chicago, Ill. Dallas, Tex.; Sydney, N. S. W.



CHEAPEST. HANDIEST. SIMPLEST. PUMPS.
Handling Dirty, Gritty and Sandy Liquids without Wear, Oil or Care. Pumping outfit for Contractors, Mining, Irrigating, Railroad Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps, and other Machinery always on hand. Exchanging
MASLINS, 165-167 First St.
Jersey City, N. J.



Brass Founders and Mfrs. of every description of Brass and Iron body goods for steam, gas and water.

Worthington Steam Pumps
CONDENSERS and WATER METERS.
HENRY R. WORTHINGTON,
86 & 88 LIBERTY STREET, NEW YORK.
BOSTON, PHILADELPHIA, CHICAGO,
ST. LOUIS, DENVER.

The **WATERBURY-FARREL FOUNDRY & MACHINE CO.,** Waterbury, Connecticut,
Builders of Rolling Mill Machinery, Special Machines for finishing and making goods from sheet Brass, Copper, Steel, Silver, &c.: **POWER PRESSES, HYDRAULIC PRESSES,** Drop Presses, Foot Presses, **RIVET MACHINES,** Gang Slitters, Grinding Machines, Steel Rolls, Wire Mill Machinery, Tube Drawing Machinery, Dies, &c.

SEAMLESS Made in all sizes
COPPER FLOATS and shapes by a
New Process.
AND Guaranteed
AIR CHAMBERS. to stand 50%
more pressure than any other make.
SEND FOR PRICES.

SPRINGFIELD BRASS CO.,
SPRINGFIELD, MASS.

The Brown Hoisting and Conveying Machine Co.,

CLEVELAND, OHIO, U. S. A.,

Sole manufacturers of the

"BROWN HOIST"

A NEW AND COMPLETE SYSTEM FOR HANDLING OF MATERIALS.

The Brown Patent Cable Tramway system.

The Brown Patent Suspended Beam Tramway system.

The Brown Patent Bridge Tramway system.

The Brown Patent Shed Tramway system.

The Brown Patent Furnace Stock Distributer.

The Brown Patent Warehouse Tramway system.

The Brown Patent Sewer Machine Tramway system.

The Brown Patent Continuous Elevated Tramway system.

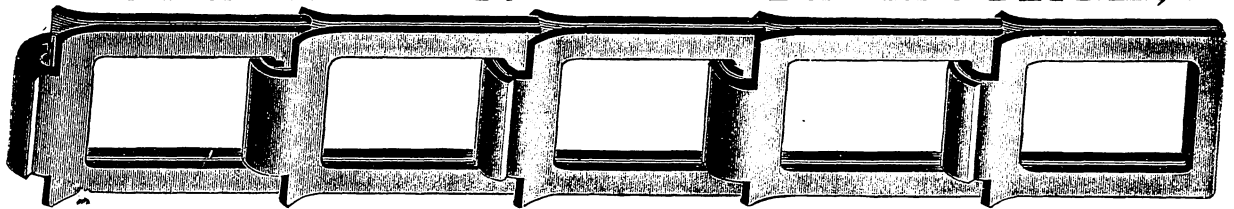
The Fayette-Brown Patent Automatic Furnace Hoist.

The Brown Patent Friction Clutch Hoisting Engine.

Self-Dumping Buckets, Skip Cars, Friction Clutches, etc.

The Most Perfect Clutch.

ROBERTS MFG. CO. - - - PITTSBURGH, PA.



PATENT DETACHABLE STEEL LINK BELTING,

sprocket Wheels and Shafting.

Send for Catalogue and reduced Price-List.

JEFFREY CHAIN BELTING.

Also MALLEABLE, WROUGHT, STEEL AND SPECIAL CHAINS for

Elevating and Conveying Machinery

DRIVE BELTS.

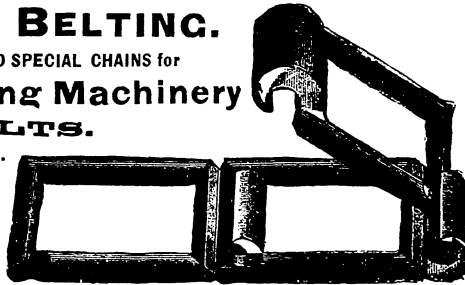
Send for 1893 Catalogue and Reduced Price-List.

THE JEFFREY MANUFACTURING CO.

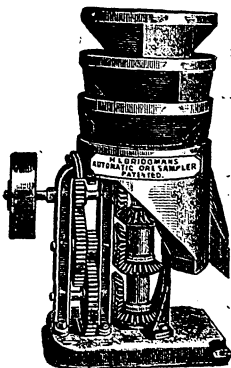
COLUMBUS, OHIO, U. S. A.

Chicago Branch, 48 So. Canal St.

New York Branch, 163 Washington St.



ALEXANDER BROS BEST OAK BELTING PHILADELPHIA.



THE H. L. BRIDGMAN PATENT ORE SAMPLING MACHINE

Used by Smelting Works, Sampling Works, and Mills which are up to date.

AUTOMATIC IN ACTION. RELIABLE IN RESULTS.

A valuable acquisition to the mining industry. It requires no expert manipulation, and cannot be used to produce false leading samples. This machine furnishes DUPLICATE SAMPLES, and saves the expense of mixing, coning and quartering. It is the only first-class Ore Sampling Machine built. It illustrates modern science and certainty, while the methods which it displaces are vague and unreliable.

It should be used by Lead, Copper, Zinc and Iron Smelting Works, Concentrating and Leaching Works, Gold and Silver Mills, Sampling Works, Etc.

Among the users of this machine are Cia Metalurgica Mexicana, San Luis Potosi, Mexico; Chicago Copper Refining Co., Blue Island, Ill.; Hemenway & Browne, Antofagasta, Chile; Francisco M. Coughlan, Catorce, Mexico.

Investigate it! Your address on a postal card to us will bring you interesting printed matter which will enable you to appreciate the value of the machine.

FRASER & CHALMERS, Sole Manufacturers, CHICAGO, ILL., U. S. A.

THE LANE & BODLEY CO.,

Cincinnati, O.

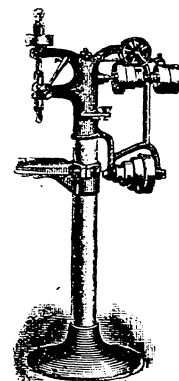
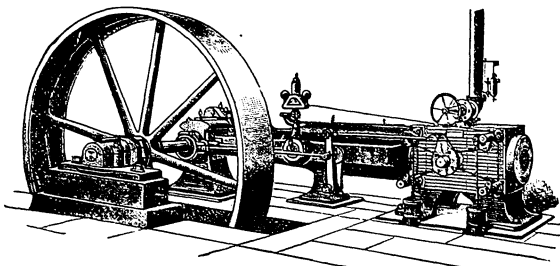
ENGINES,

ALL SIZES

Simple and Compound,
CORLISS ENGINES A SPECIALTY.

Heavy Slide Valve Engines.

Shafting, Hangers, Pulleys,
Belt Elevator, etc.



The Norton Drills

for light, sensitive and rapid drilling. 1, 2, 3, 4 or more spindles, sensitive or automatic feed. To drill from 0 to 1/4-inch holes. The latest and best. Most convenient, sensitive and durable drills on the market. Have balanced spindles and balanced tables. Write for prices and description, or for special machinery.

THE
NORTON & JONES MACHINE TOOL WORKS,
PLAINVILLE, CONN.

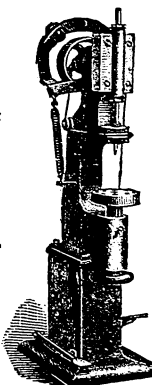
JOHN ADT & SON,

New Haven, Conn.

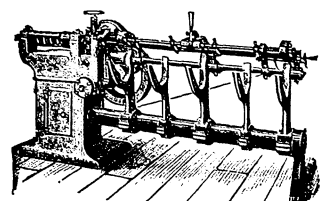
BUILDERS OF

MACHINERY FOR HARDWARE MANUFACTURE.

Elastic Rotary-Blow Riveting Machine.

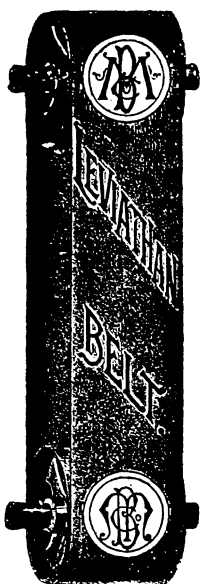


Butt Milling
Machinery,
Butt Drilling
Machinery,
Riveting
Machines,
Wire Straightening
Machinery,
Foot Presses,
Sprue Cutters,
Etc.



Automatic Wire Straightening and Cutting Machine.

LEVIATHAN BELTING



Positively unequalled for Strength, Durability and Traction Power; unaffected by Heat, Steam or Water.

Belts for Main Driving and work of a heavy nature a specialty.

MAIN BELTING COMPANY

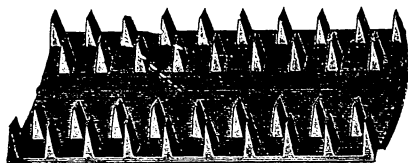
Sole Manufacturers
1219-1235 Carpenter St.,
PHILADELPHIA.

248 Randolph Street, Chicago.

120 Pearl Street, Boston

Send for Price-Lists and Samples.

Talcott's Original Wilson Belt Hooks

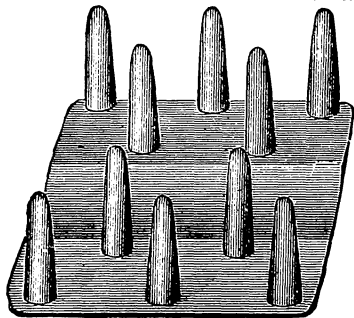


W. O. TALCOTT, Providence, R. I.

MANUFACTURER OF

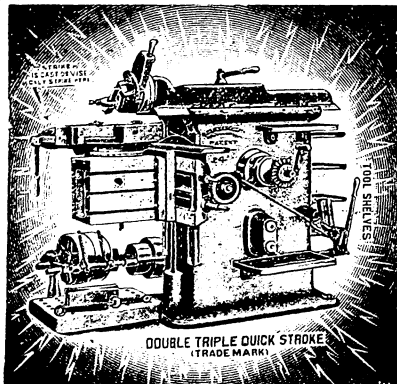
Four Styles of BELT HOOKS, Including 134 Sizes
SEND FOR CATALOGUE.

Thacher's Patent BELT FASTENERS.



Manufactured by
The Claffen Manufacturing Co., Cleveland, O.
Office, 71 and 73 Ontario St.

FOR THE
"Double Triple Quick Stroke"
SHAPER
WRITE TO
GOULD & EBERHARDT Newark N. J.



12 in., 16 in., 20 in., 24 in., 28 in., 30 in. stroke.

NEW YORK BELTING & PACKING CO.

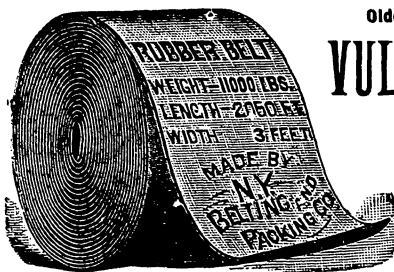
(LIMITED.)

JOHN H. CHEEVER,
President.

15 Park Row, New York.

Oldest and Largest Manufacturers in the U. S. of

VULCANIZED RUBBER FABRICS



For Mechanical Purposes.

MACHINE BELTING

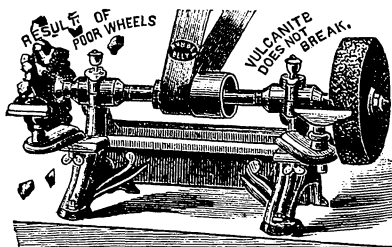
With Smooth Metallic Rubber Surface.



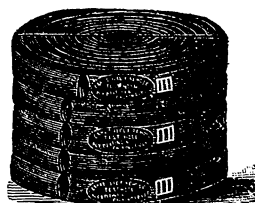
RUBBER TEST HOSE

COTTON "CABLE" HOSE, CIRCULAR, WOVEN, SEAMLESS, ANTISEPTIC.

For the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories and Steamers.



Rubber Cement.



THE ORIGINAL SOLID VULCANITE EMERY WHEELS.

RUN EASY and SAFE, COOL and TRUE. ARE MORE DURABLE—HENCE CHEAPER. A trial will convince you of this. KNIFE GRINDING WHEELS A SPECIALTY.

Rubber Goods to Order for all Mechanical Purposes.

SALESROOMS:

PHILADELPHIA, 308 Chestnut St.
BOSTON, 52 Summer St.
CHICAGO, 161 Lake St.
DENVER, 1601-1611 17th St.
CHARLESTON, 180 Meeting St.
GRAND RAPIDS, 4 Monroe St.
MINNEAPOLIS, 28 South 2d St.
CLEVELAND, 178 Superior St.

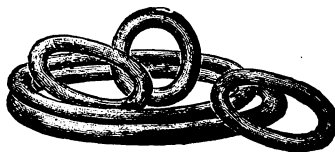
European Branch:—98 and 100 Queen Victoria St., London, England.

SALESROOMS:

SAN FRANCISCO, 17 Main St.
DETROIT, 16-20 Woodward Ave.
BALTIMORE, 12 N. Charles St.
NEW ORLEANS, 8-12 N. Peters St.
KANSAS CITY, 1311 and 1313 W. 12th St.
ST. LOUIS, 616 Locust St.

H. O. CANFIELD,

MOULDED BRIDGEPORT, CONN.



RUBBER GOODS FOR MECHANICAL PURPOSES.

Small moulded work a specialty. Send for estimates for moulds and work.

Records, like Pedigrees, are well to consider.

It is on record that after nearly 20 years' service, roofs painted with Dixon's Silica-Graphite Paint have not even required repainting, but were in as good condition as when first put on.

Dixon's Silica-Graphite Paint

Has been in the market for 25 years. Its record for durability and economy is unquestioned.

MAY WE SEND YOU OUR CIRCULARS?

JOS. DIXON CRUCIBLE CO.,
JERSEY CITY, N. J.

E. W. BLISS CO.,

16 ADAMS ST., BROOKLYN, N. Y.

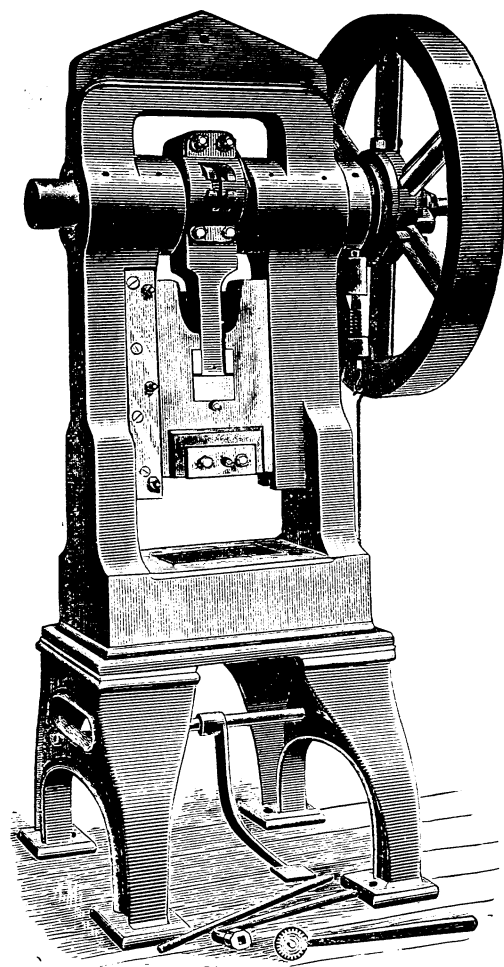
Western Office, 14 N. CANAL ST., CHICAGO.

Our Last Year's (1892) Sales included the following Tools:

- 509 POWER PRESSES, Single Pitman Type. For Punching, Shearing, Blanking, Perforating, Embossing, Reducing, etc.
- 52 DOUBLE CRANK PRESSES. For Shearing, Punching, Blanking, Perforating, Forging, Embossing, etc.
- 58 HORN and WIRING PRESSES.
- 54 DOUBLE-ACTION DRAWING PRESSES. Some as heavy as 60 tons, and averaging 10 tons each.
- 36 SPECIAL PRESSES—Automatic.
- 38 SPRUE-CUTTING PRESSES.
- 223 FOOT and HAND POWER PRESSES.
- 69 DROP-HAMMERS.
- 71 FORMING and SQUEEZING MACHINES.
- 109 ROLLING, BEADING and FLANGING MACHINES.
- 59 DOUBLE SEAMING MACHINES.
- 23 SPINNING LATHES. With Wiring and Trimming Attachments.
- 24 WIRE FORMING and CUTTING MACHINES.
- 8 SOLDERING MACHINES.
- 6 LARGE MILLING MACHINES.
- 68 SQUARING and PLATE SHEARS. For Rolling Mills, etc.

— ALSO —

THOUSANDS OF DIES AND SPECIAL TOOLS.



Owners also of
THE STILES & PARKER PRESS CO.

SENT ON 30 DAYS'

METAL BAND SAW MACHINE,

MADE BY

Cross & Speirs Machine Co.

WATERBURY, CONN.

SAWS tubing, square or straight, also sheet brass, rods and bars.

SAWS curves and scrolls, gates from castings, etc.

INDISPENSABLE

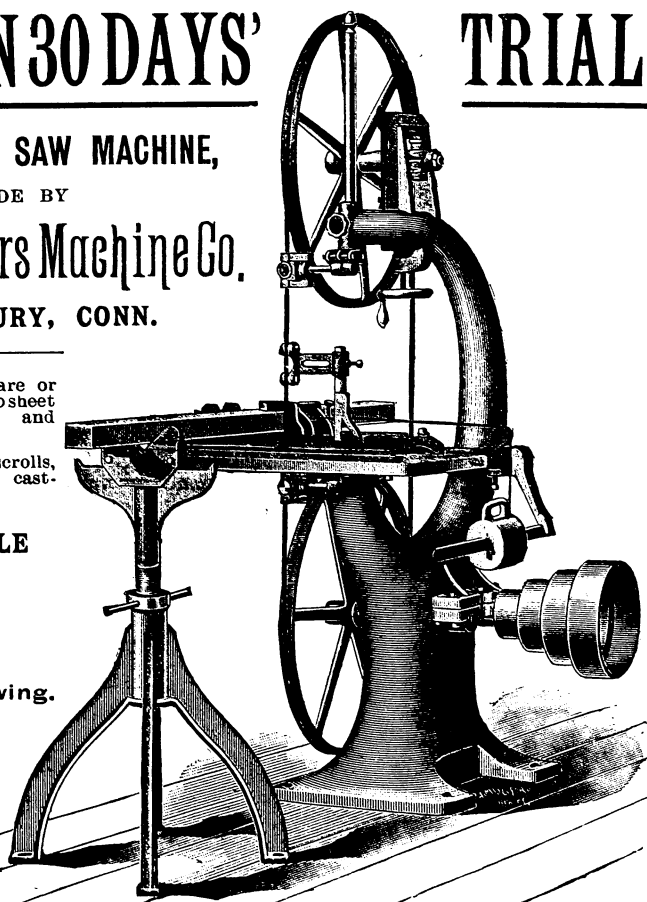
TO ALL

Metal Workers,

Handy,

Labor Saving.

Self-regulating and does not require skilled labor.

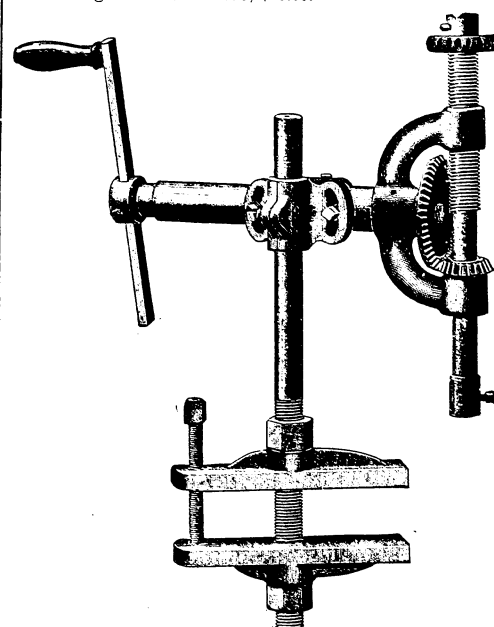


SEND FOR PRICE.

TRIAL.

CLAMP DRILLS.

- No. 1 will drill a $\frac{5}{8}$ inch hole, $2\frac{1}{4}$ inches deep. Weight, 30 lbs. Price, \$15.00.
- No. 2 will drill a 1 inch hole, $2\frac{1}{2}$ inches deep. Weight, 40 lbs. Price, \$20.00.
- No. 3 will drill a $\frac{5}{8}$ inch hole, 4 inches deep. Weight, 40 lbs. Price, \$20.00.
- No. 4 will drill a 1 inch hole, 4 inches deep. Weight 50 lbs. Price, \$25.00.



THE GEO. BURNHAM CO.,
WORCESTER, MASS.

FOR TESTING IRON AND STEEL SPECIMENS, CAR COUPLERS, BRAKE SHOES, CHAIN, SPRINGS, WIRE, CEMENT

RIEHLE TESTING MACHINES,

Hydraulic Pumps and Presses, Roble Jacks, Marble Machinery, Iron Founders & Machinists, Riehle Bros. Testing Machine Co., 9th St. abv. Master, Phi a

The Dupont Power Hammer.

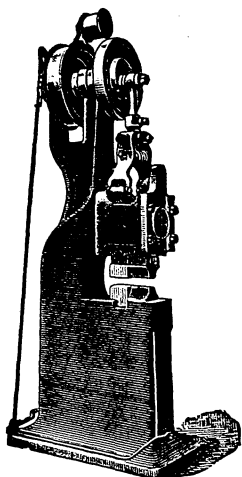
ITS POINTS OF SUPERIORITY.

No. 5. CAPACITY FOR WORK.

A large variety of work can be done with this Hammer, and by using suitable dies, work can be turned out in large quantities that is uniform in size and shape, which is an important item in finishing up work; as, for instance, carriage work, where large numbers of the same pieces are wanted, and can be finished by the Hammer.

The dies always come together square on any size or thickness of work, so that parallel sides are sure to be obtained where wanted.

DUPONT MANUFACTURING COMPANY,
ST. JOHNSBURY, VT.



THE BECKER UPRIGHT UNIVERSAL MILLERS

Have a remarkable range of utility and are more indispensable than common horizontal millers.

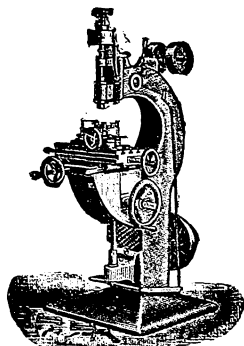
No. 2 is adapted for a great variety of light milling, carrying mills from 1-32 in. diam. up to 2 in. diam. Speeds from 100 to 10,000 revolutions per minute.

No. 3, for all round work, such as *Face Milling, Milling Dovetail Slides, Key Seating, Splining, Boring* and many other purposes. Carries mills from 1-8 in. to 4 in. diam. Speeds from 40 to 2000 revolutions per minute.

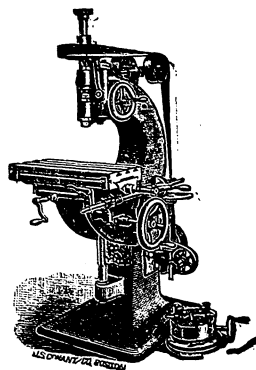
SEND FOR CATALOGUE.

JOHN BECKER MFG. CO.,

Fitchburg, Mass.



NO. 2.



NO. 3.

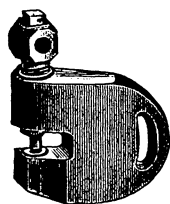
8-FOOT PAT. BENDING ROLLS.

**AUTOMATIC
SELF OPENING
AND CLOSING.**

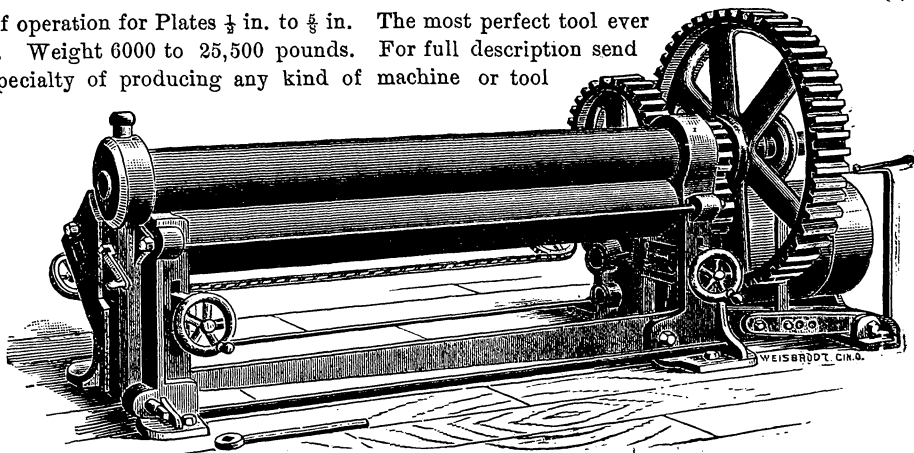
A revolution for quickness and ease of operation for Plates $\frac{1}{2}$ in. to $\frac{5}{8}$ in. The most perfect tool ever devised for heavy bending and forming. Weight 6000 to 25,500 pounds. For full description send for descriptive circular. We make a specialty of producing any kind of machine or tool wanted for working Sheet Metal, Plate or Bar Iron.

STEEL SCREW PUNCHES.

Furnished with three sets of Punches and Dies. Extra heavy made to order.



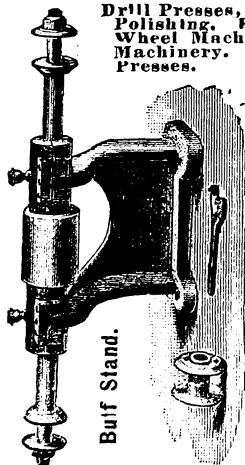
Bertsch & Co.,
Cambridge City,
IND.



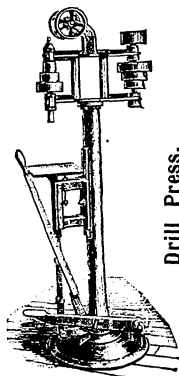
HERRICK & COWELL

MANUFACTURERS,

Drill Presses, Paper Box, Boring,
Polishing, Electrotypes, Emery
Wheel Machinery, and Special
Machinery. Power and Foot
Presses.



Bull Stand.

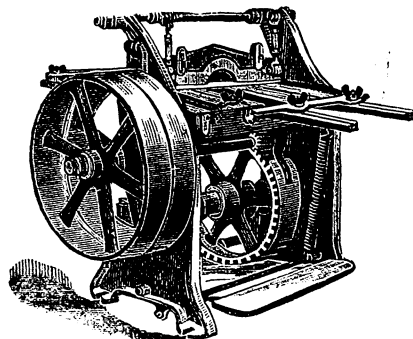


Drill Press.

NEW HAVEN, - CONN.

SEND FOR CATALOGUE.

Machines and Tools for Sheet Metal Working.



TINNERS'
ROOFERS'
SLATERS'
CANNERS' } TOOLS.

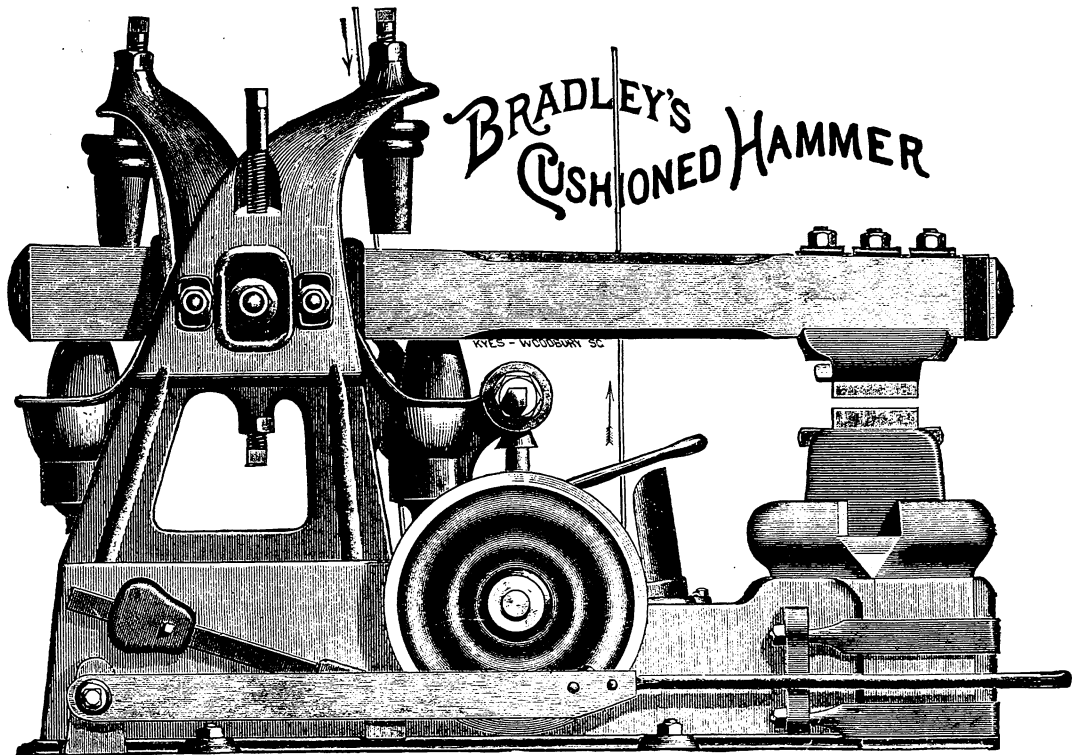
Squaring Shears, Circle,
Slitting and Ring Shears,
Forming Rolls.

Presses, Dies.

NIAGARA STAMPING & TOOL CO.,

Write for Catalogue.

BUFFALO, N. Y.



Bradley Hammers.

THE FIVE POINTS.

1. Force of blow under perfect control.
2. Rubber Cushions that absorb the concussion.
3. Eccentric and Strap with great wearing surface.
4. Anvil Block made separate from main frame.
5. Friction Slip Sleeve that instantly changes length of stroke.

**NEVER
QUESTIONED.**

The superiority of the **BRADLEY HAMMER** has never been questioned. It has stood at the head always. What does a little difference in price amount to when it is in the goods many times over?

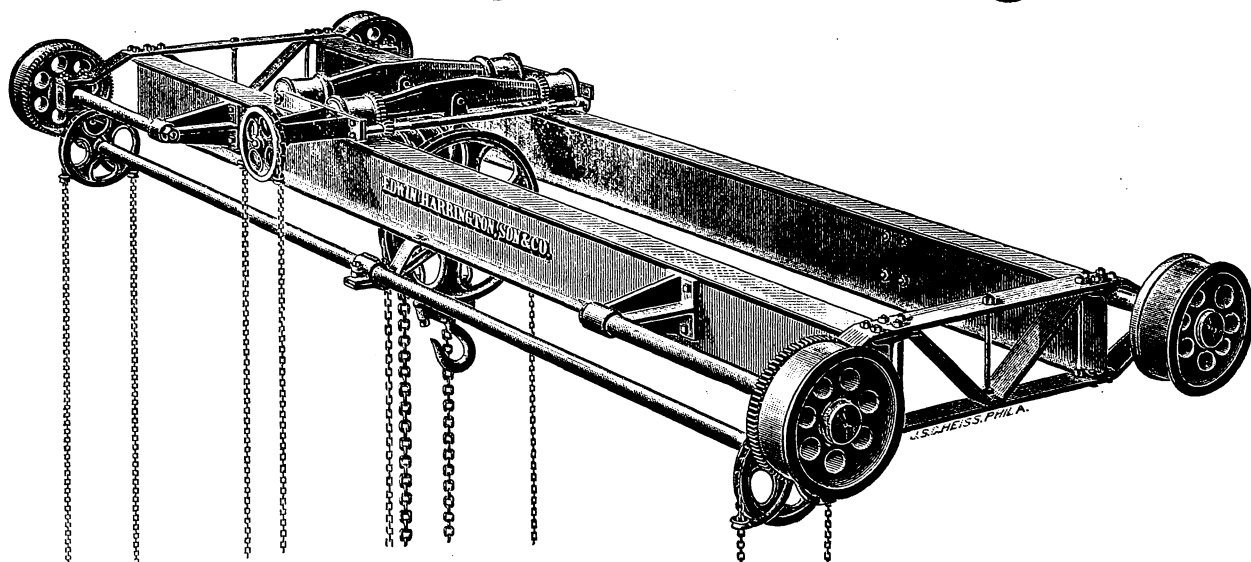
We manufacture Helve, Upright and Beaudry Hammers, and Hard Coal Heating Forges to use with them. Send for our Circulars and Prices.

If we knew what you wanted to do we could suggest the proper size of Hammer and Forge.

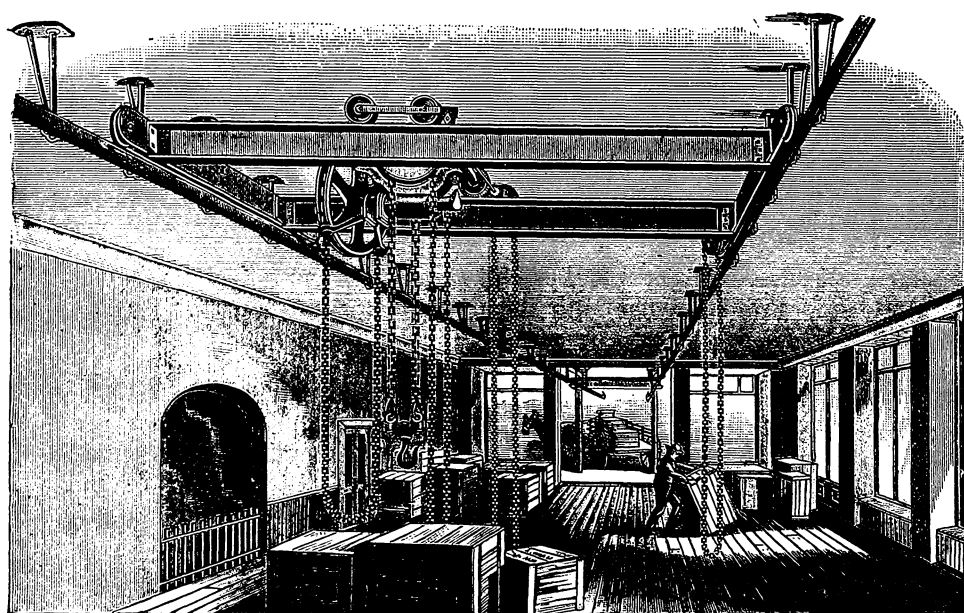
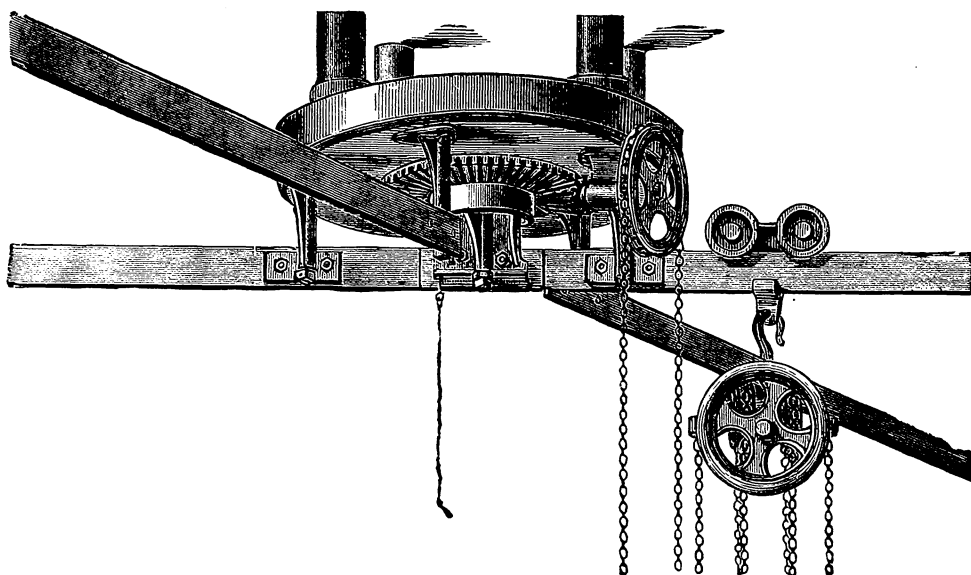
— BRANCHES: —
BOSTON, 96 & 98 Sudbury St.
NEW YORK, 14 Warren St.

BRADLEY & COMPANY,
SYRACUSE, N. Y.

Harrington's Improved Traveling Cranes.



Complete System
of
Overhead Tramway.



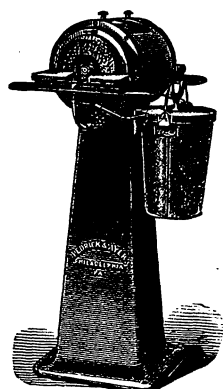
Catalogues
and
Estimates
Furnished on
Application.

Edwin Harrington, Son & Co.,

1508 PENNSYLVANIA AVENUE, PHILADELPHIA, PA.

ESTABLISHED 1867.

WINGS' PATENT CENTRIFUGAL GRINDING MACHINES.



HORIZONTAL DOUBLE GRINDER.

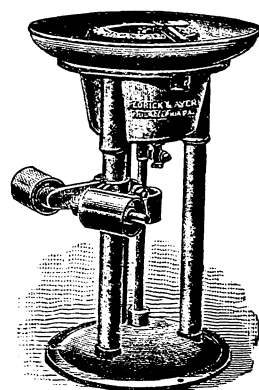
This machine is adapted to machinists' tool grinding and carries two grinding wheels, one at each end of arbor.

The water is carried to wheels from tank by head force, and back again into tank by centrifugal force, keeping a continuous circulation as long as enough water is kept in tank to cover supply pipes.

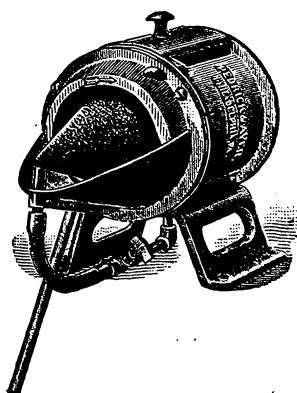
UPRIGHT GRINDER.

On this machine the water is brought on to and carried over the surface of wheel and back to tank again by centrifugal force alone and so continuously as long as water is kept in tank.

The grinding face of wheel is slightly beveled to accommodate the grinding of long knives which have to lay across the wheel from one side to the other. It is designed for grinding all kinds of wood-working tools having straight edges like planes, chisels, knives, etc., and is also effective for grinding machinists' and kindred tools.



GOUGE AND CUTTER GRINDER.



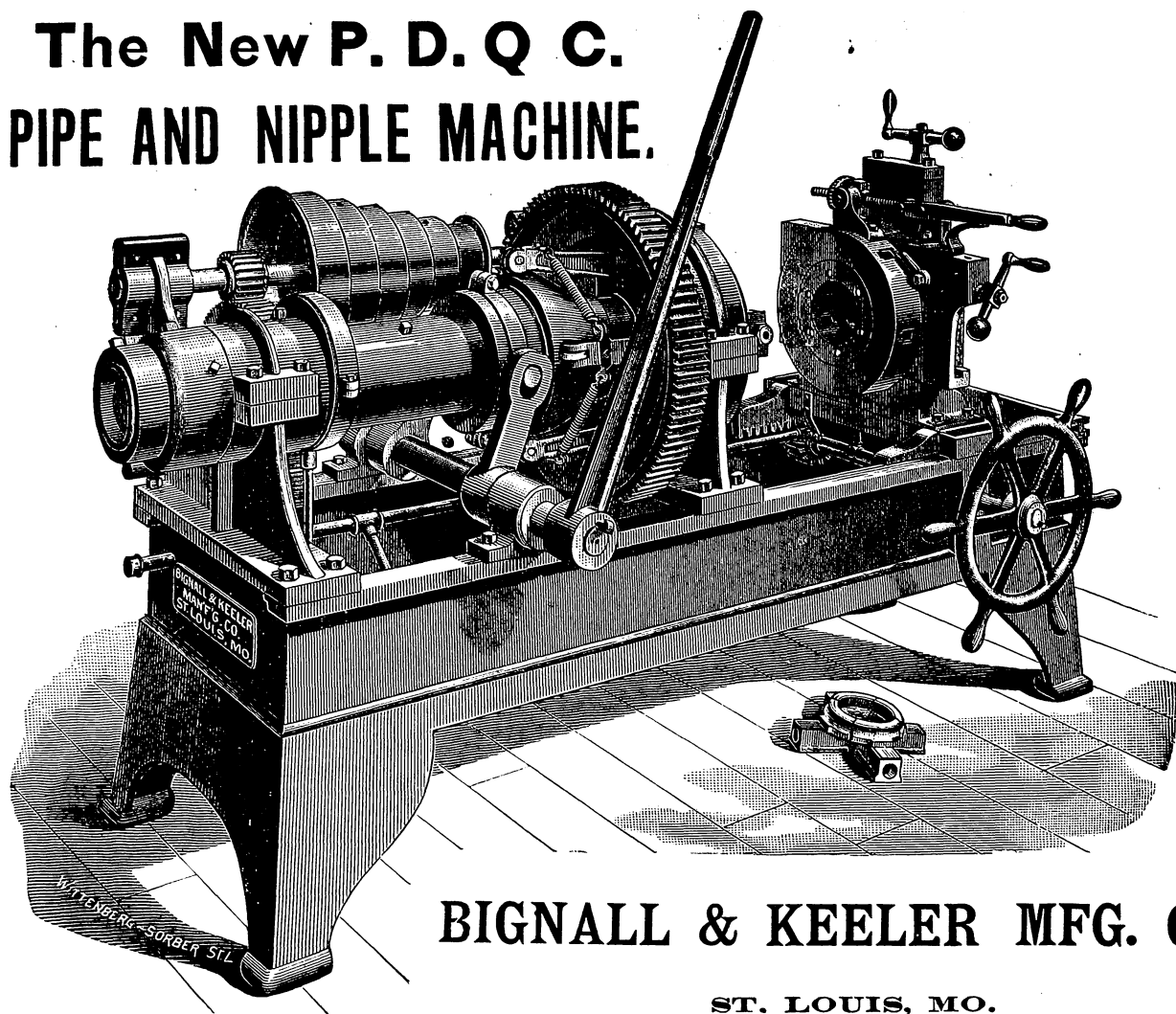
This little machine is designed for grinding inside gouges, cutters and tools having concave cutting edges, and will grind all such tools to a true arc of a circle within its limits. It will be found more serviceable and effective than a whole gang of wheels mounted in the ordinary way. It supplies itself continuously with an abundant amount of water in the same manner as the Horizontal Double Grinder. This machine is made either single or double, as desired.

The above machines possess all the virtue of the emery wheel for rapid cutting and accurate work, and **WITHOUT DRAWING OF TEMPER.** They are guaranteed in every particular. Circulars and prices on application.

PEDRICK & AYER,

1001 and 1003 Hamilton St., Philadelphia, Pa.

The New P. D. Q. C. PIPE AND NIPPLE MACHINE.

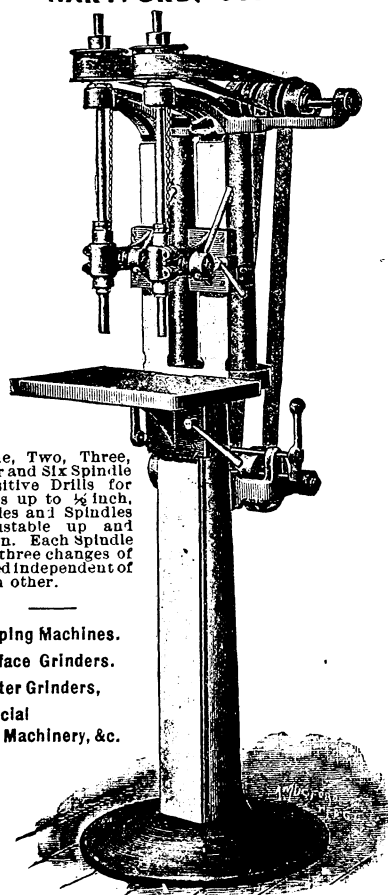


Send for description and prices. Capacity unequalled. Mechanism equal to that in the finest machine tools. All gears machine cut. All parts made on duplicate plan. Prices very low.

BIGNALL & KEELER MFG. CO.,

ST. LOUIS, MO.

Woodward & Rogers,
HARTFORD, CONN.



One, Two, Three, Four and Six Spindle Sensitive Drills for holes up to 1/2 inch. Tables and Spindles adjustable up and down. Each Spindle has three changes of speed independent of each other.

Tapping Machines.
Surface Grinders.
Cutter Grinders,
Special Machinery, &c.

**G. A. Crosby
& Co.,**

176 and 178 So. Clinton St.
CHICAGO, ILL., U. S. A.

MANUFACTURE

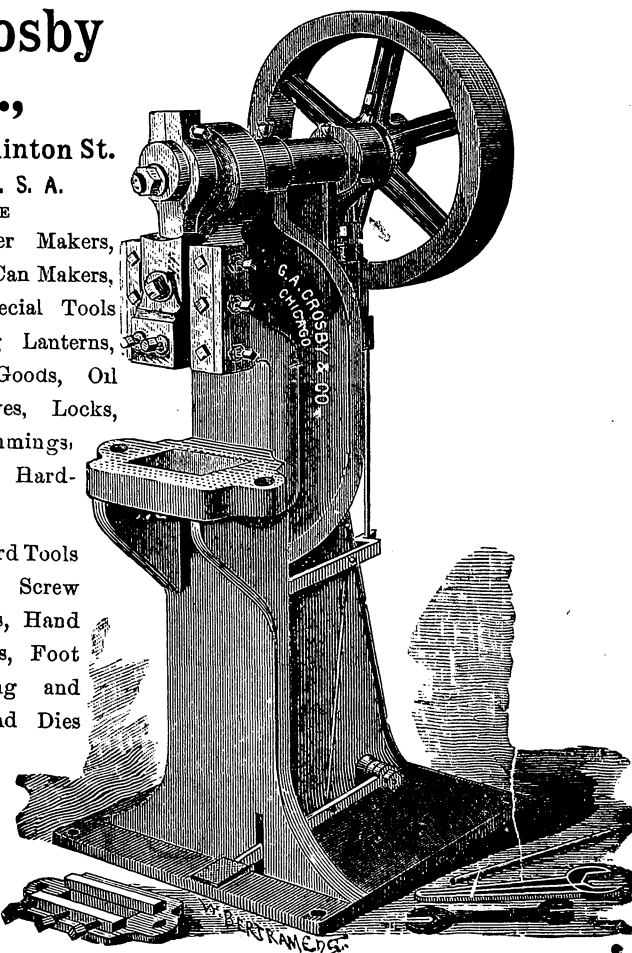
Machinery for Boiler Makers, Sheet Metal Workers, Can Makers, Soap Makers and Special Tools to order for making Lanterns, Bird Cages, Wire Goods, Oil Stoves, Vapor Stoves, Locks, Hinges, Trunk Trimmings, Brass Goods and all Hardware Novelties.

Among their Standard Tools are Power Presses, Screw Presses, Foot Presses, Hand Presses, Drop Presses, Foot and Power Squaring and Trimming Shears and Dies of every description.

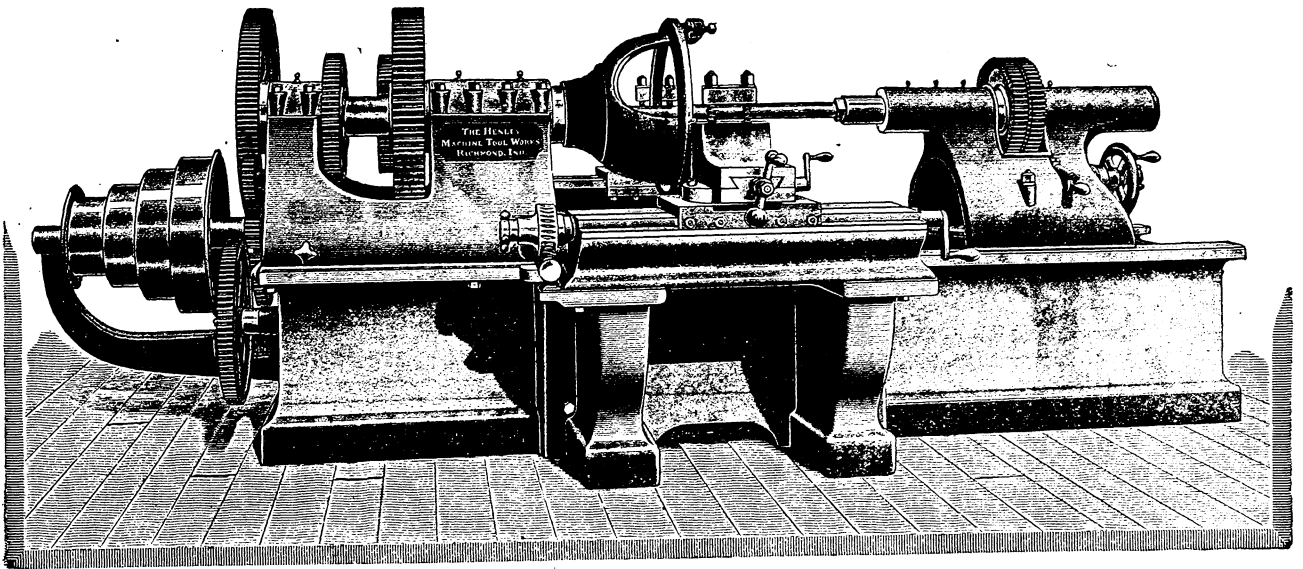
Write for Prices.

Work Guaranteed the Best.

Agents for the Clark Perfection Kerosene Oil System, or heating soldering apparatus.



PULLEY LATHES



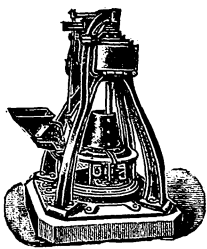
Patented Feb. 17, 1891; June 14, 1887.

This cut represents the 42-inch Lathe. The 60-inch Lathe is of same design, but much heavier throughout. The 30-inch Lathe is of same general construction, with the bed supported on feet at each end.

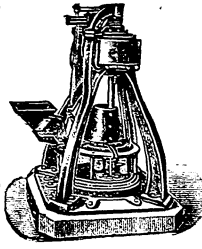
These Lathes are especially designed for Simultaneously Boring and Turning Pulleys, both straight and crowning face, Cone Pulleys, Gear Blanks, and a variety of other work.

MANUFACTURED BY

THE HENLEY MACHINE TOOL WORKS, Richmond, Indiana.



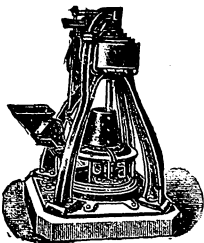
The most successful Machine made for
Pulverizing Quartz,
Ores of all kinds,
Phosphate Rock,
Carbon Foundry Facings,
Plumbago, Portland Rock,
and Cements, etc.



A PERFECT PULVERIZER,

THE NEW GRIFFIN MILL,

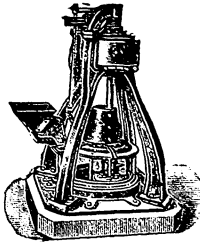
OF ALL REFRACTORY SUBSTANCES.



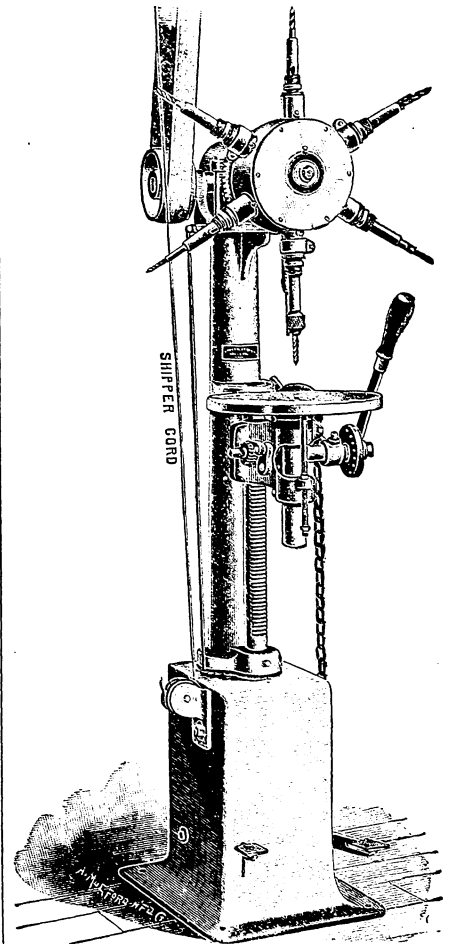
Will work either wet or dry.
Capacity from two to four tons
per hour, to sixty mesh or finer.
Descriptive pamphlet and full
information furnished on ap-
plication to

Bradley Fertilizer Co.,

92 STATE STREET, - BOSTON.



QUINT'S TURRET DRILLS. SIX SPINDLE.



Speed of Drills from 250 to 2,000 revolutions, and may be changed to any intermediate speed instantly; only the Drill in use revolves, all others remain stationary.

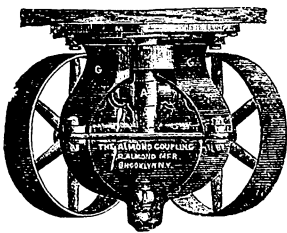
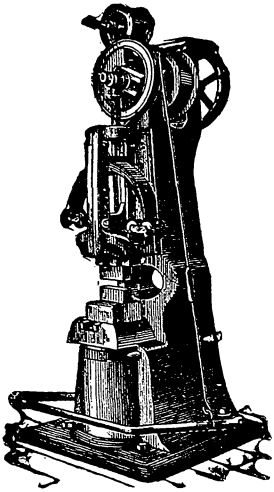
Send for Circular. Drills from 0 to 1/4 inch.
Address **A. D. QUINT, Hartford, Conn.**

BOOKS.

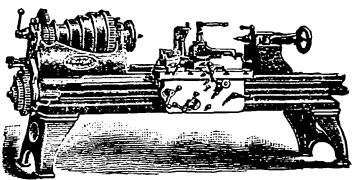
YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing **DAVID WILLIAMS, Publisher** and bookseller, 96-102 Reade St., New York.

If You Use Power Hammers

Write to us for Circulars.
BELDEN MACHINE CO
NEW HAVEN, CONN.

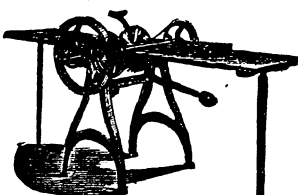


THIS CUT REPRESENTS
ALMOND'S PAT. QUARTER-TURN COUPLING
To Replace Mule Pulleys and Bevel Gears.
It is a noiseless quarter-turn countershaft, self-contained, perfectly lubricated, and gives no trouble. Send for particulars.
T. R. ALMOND, 83 and 85 Washington Street
Brooklyn, N. Y.



NEW HAVEN MANUFACTURING CO.
NEW HAVEN, CONN.
Manufacturers of
IRON-WORKING MACHINERY
Planers, Shapers, Drills, Slotters, Etc.

BARNES
Hand and Foot Power Machinery,
FOR CARPENTERS AND BUILDERS.



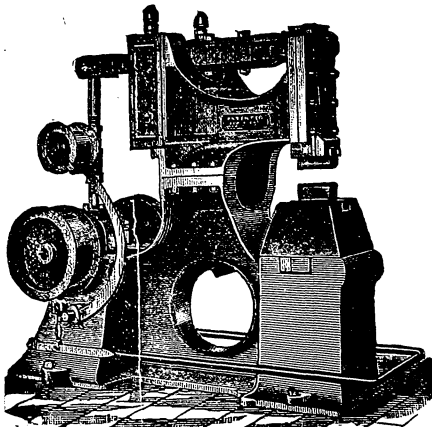
Complete Line of Seven Machines.
Hand Circular Rip Saw
Combined Rip and Cross-Cut Saw (with Scroll Saw and Boring Attachments).
Scroll Saw, Former, Mortiser, Tenoner & Lathe
Discounts to the trade on application. Send for Catalogue and Price-List.
W. F. & JOHN BARNES CO.,
69 Ruby Street, ROCKFORD, ILL.
ENGLISH AGENTS, CHAS. CHURCHILL & CO.,
Cross Street Finsbury, E. C., London

LINK-BELT

ENGINEERING CO
NICETOWN,
PHILA.
49 DEY ST.
NEW YORK

Elevators, Conveyors, Manila Rope Power Transmission Machinery, Ewart Detachable Link Belting
Dodge Chain, Howe Chain, &c. Western connection.
[CHICAGO,] [LINK BELT MACHINERY CO.]

JENKINS' POWER HAMMERS.



Adjustable and elastic stroke, nicety of regulation, efficiency of action, simplicity and durability of construction and the absence of leather straps, steel springs and all complication, combine to make this hammer the favorite wherever used.

JENKINS & LINGLE,
BELLEFONTE, PA.

PITTSBURGH MFG. CO.,

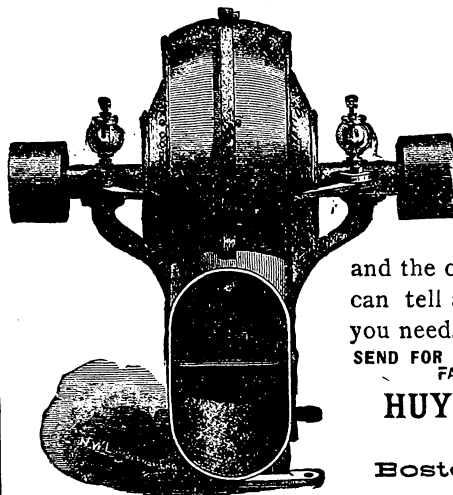
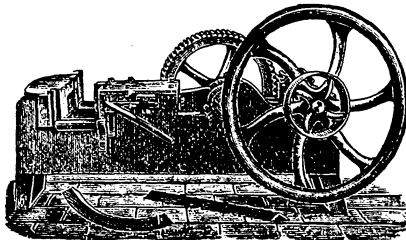
Manufacturers of

Crosgrove's Patent Straightening, Bending and Punching Machines.

NAIL MACHINERY.

Bolts, Nuts, Rivets, Castings, &c.

PITTSBURGH - PA.



IN EVERY line of manufacture there is always a leader.

The Huyett & Smith Mfg. Co.
Detroit, Mich., are the leading manufacturers of Forge and Pressure Blowers—saving fifty per cent. in power over all other Blowers.

Send inside diameter of Cupola and the combined area of all openings, and we can tell at once the size of the Blower that you need.

SEND FOR OUR ILLUSTRATED CATALOGUES OF HEATERS, FANS, DUST ARRESTERS AND DRY KILNS.

HUYETT & SMITH MFG. CO.,
DETROIT, MICH.

Boston, Chicago, New York.

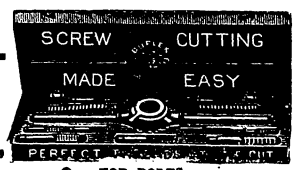


THE ADJUSTABLE
"DUPLIX" DIE STOCK.

Quick. Accurate. Durable.

15,000 now in use.

HART MANUFACTURING CO.,
CLEVELAND, O., U. S. A.



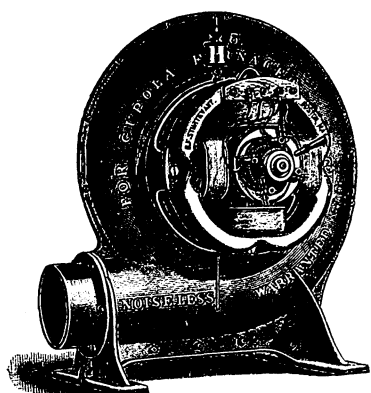
SCREW CUTTING
MADE EASY
PERFECT WORKING
FOR BOLTS.

THE

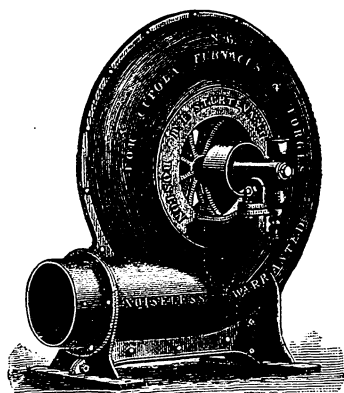
STURTEVANT

STEEL

Pressure Blowers.



Blower with Electric Motor.



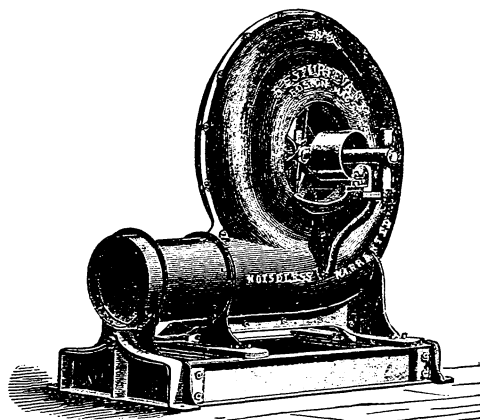
Pressure Blower.

—FOR—

CUPOLA FURNACES

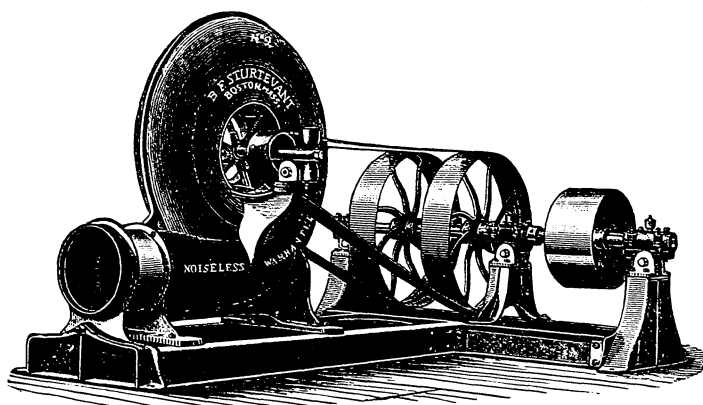
—AND—

FORGE FIRES.



Blower on Adjustable Bed.

Portable
Forges,
Blast Gates
Countershafts,
Blast Pipes.



Blower on Adj. Bed with combined Countershaft.

Send for
Catalogue
No. 70.

B. F. STURTEVANT CO.,

BOSTON, MASS., U. S. A.

SALESROOM:

34 Oliver Street,

MAIN OFFICE AND WORKS:

Jamaica Plain Station.

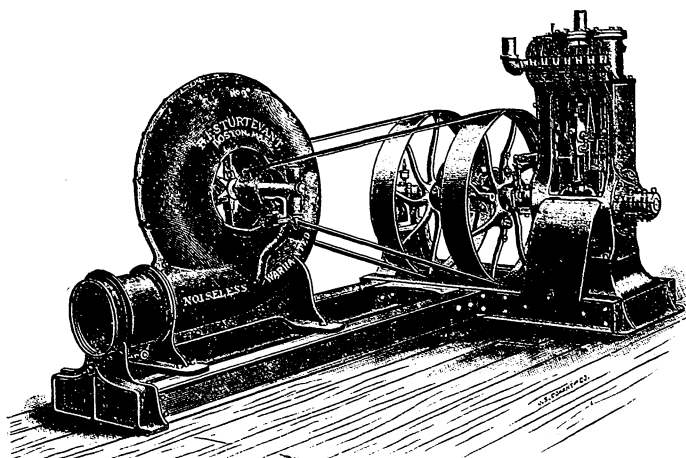
BRANCH STORES:

91 Liberty St., New York, N. Y.

135 No. Third St., Philadelphia, Pa.

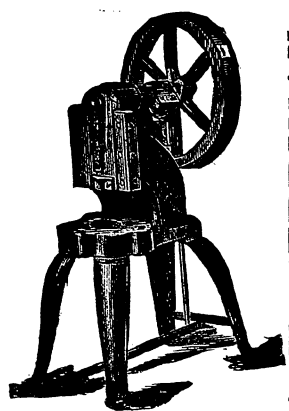
16 So. Canal St., Chicago, Ill.

75 Queen Victoria St., London, Eng.



Blower on Adj Bed, with double inclosed Engine.

FULL LINE OF STOCK CARRIED AT ALL BRANCHES.



A. H. MERRIMAN,
MERRIDEN, CONN.,
Manufacturer of all Descriptions of
PRESSES.
Catalogue and prices sent on application.

GEO. V. CRESSON CO.

18th St. and Allegheny Ave.,

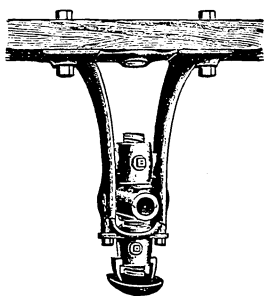
PHILADELPHIA, PA.

SHAFTING

AND

TRANSMISSION MACHINERY

Electric Light Plants Designed
and Completely
Furnished.

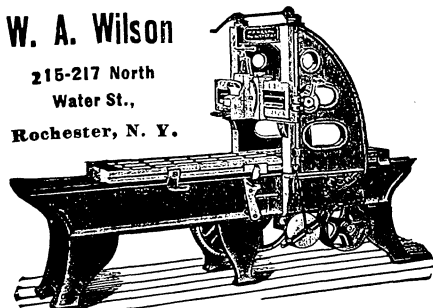


Our New Patent Improved Part-
ing Hangers, with or with-
out Self-Oiling Bearings.

W. A. Wilson

215-217 North
Water St.,

Rochester, N. Y.



Improved Iron Planers a specialty. 20 x 20, 22 x 22
24 x 24 up to 42 x 42, to plane any length. Send for
description and price-list before purchasing. Manu-
facturers' agent for other tools and machinery. Men-
tion *The Iron Age*.

THE POWELL PLANER CO.

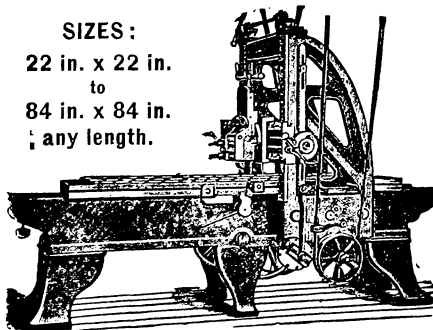
SIZES:

22 in. x 22 in.

to

84 in. x 84 in.

any length.



WORCESTER, MASS.

GEORGE H. EATON & COMPANY,

Office, 10 Mt. Washington Av.,
Boston, Mass., U. S. A.

MANUFACTURERS OF

Power, Drawing, Screw, Lever
and Drop

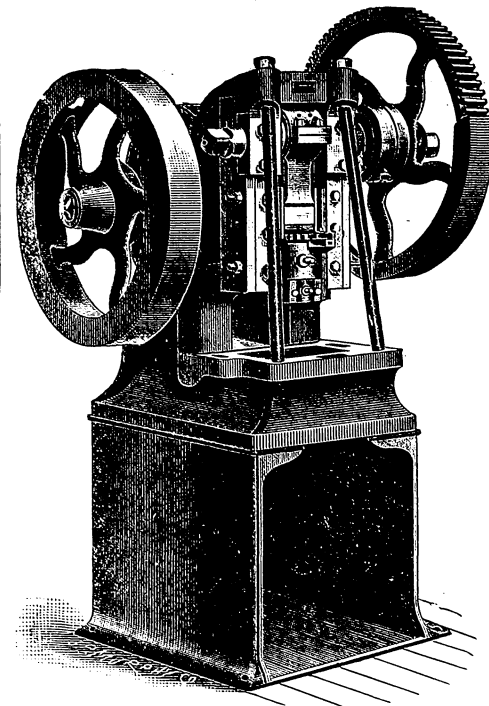
Presses and Dies.

HAND, POWER, ROTARY AND SQUARING
SHEARS.

CATALOGUES ON APPLICATION.

SELLING AGENTS.

Hill, Clarke & Co., 12 and 14 So. Canal St.,
Chicago, Ill.
The Parkin & Bosworth Co., 9 and 11 So.
Water St., Cleveland, O.
The Fairbanks Company, 701-705 Arch St.,
Philadelphia, Pa.
The Garvin Machine Co., Lighthouse and Canal
Sts., New York, N. Y.



HYDRAULIC JACKS.

All sizes. All styles. All warranted.

HYDRAULIC PRESSES,

PUMPS, ACCUMULATORS, VALVES, GAUGES, FITTINGS, &c.

WATSON & STILLMAN,

204-210 E. 43d St., New York

Presses, Dies, Presses, OF ALL KINDS FOR Sheet Metal Ware.

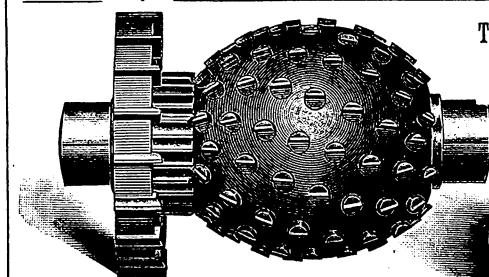
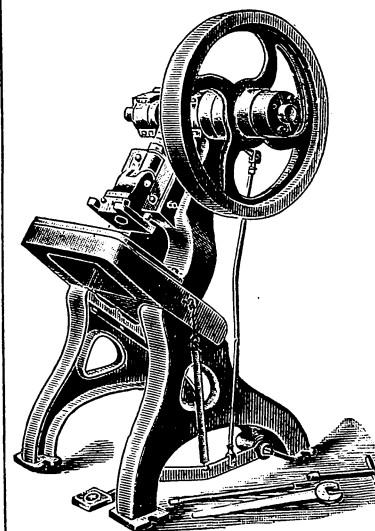
Difficult and Intricate Drawing
Stamping, Embossing, Wiring,
Blanking and Combination
Dies a Specialty.

SUBMIT SAMPLES AND WRITE FOR PRICES.

Stark Machine & Tool Co.,

BUFFALO, N. Y.

Send for Catalogue and mention "The Iron Age."



Pat. Dec. 24, '89.

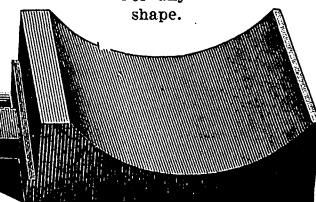
The Ingersoll Milling Mch. Co., Rockford, Ill.

MILLING MACHINES,

15 inch to 36 inch square.

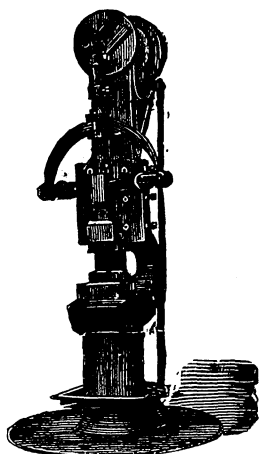
MILLING CUTTERS

For any
shape.



DEAD-STROKE POWER HAMMERSCONSTRUCTION IMPROVED.
Prices Reduced.

5 to 250 Pounds.

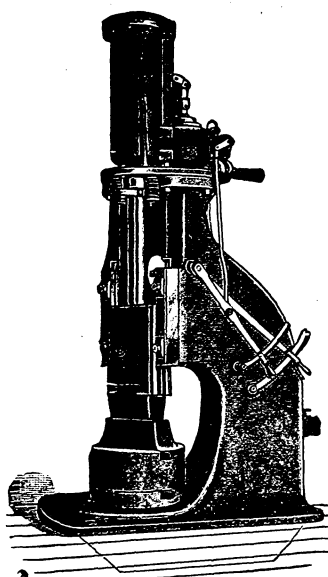


and is now a pound size are specially adapted to
filmmakers' use, the other sizes for general forging.
Send for circular and references.

DIENELT & EISENHARDT,

MAKERS,

1310 Howard St., Philadelphia.

**Bement, Miles & Co.,**

PHILADELPHIA, PA.,

Builders of

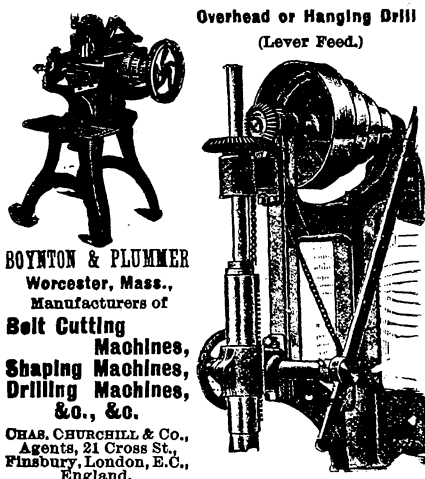
**Metal-Working
Machine Tools**

For railroad shops, locomotive and car builders,
machine shops, steam forges, shipyards, boiler-
shops, bridge works.

**Steam Hammers for Working Iron-
or Steel.**

NEW YORK OFFICE, Equitable Building.

GEORGE PLACE, Agent..

Overhead or Hanging Drill
(Lever Feed.)**BOYNTON & PLUMMER**
Worcester, Mass.,
Manufacturers ofBelt Cutting
Machines,
Shaping Machines,
Drilling Machines,
& Co., & Co.CHAS. CHURCHILL & Co.,
Agents, 21 Cross St.,
Finsbury, London, E.C.,
England.**AUTOMATIC REGISTER.**

The most accurate and reliable counter manu-
factured. Made entirely of metal.



Handsomely finished. Can be used on any
machine. Send for circular.

G. EDW. OSBORN & CO.,
391, 393 & 395 State St., New Haven, Conn.**FOR**Substantial, Well Made
Low Priced, Patented**20 Inch Drills**

with latest improvement
Lever, Combination or Wheel
Feed, address

Sibley & Ware,
South Bend, Indiana**A Practical Workshop Companion
for Tin, Sheet-Iron and**

Copper-Plate Workers. By LEROY J. BLINN:
new revised, enlarged edition, with over 170
newly engraved illustrations: 296 pages; 12mo,
cloth.....\$2.50

This deservedly popular book has been thor-
oughly revised and contains over 100 additional
pages, with 170 newly engraved illustrations.
The volume contains rules for describing vari-
ous kinds of Patterns used by Tin, Sheet-Iron
and Copper-Plate Workers: Practical Geometry;
Measurement of Surfaces and Solids; Tables of
the Weights and Strengths of Metals and other
Materials; Tables of Areas and Circumferences
of Circles; Composition of Metallic Alloys and
Solders, with numerous valuable Receipts and
Manipulations for every-day use in the work-
shop. Sent, post-paid, on receipt of price by

DAVID WILLIAMS, Publisher,

96-102 Reade St. New York.

**B. & O. SURE GRIP
TIRE UPSETTER.**

Size.	Capacity.	List Price.
No. 1,	3 x 3/4 and smaller,	\$20.00
No. 2,	4 x 1	30.00

IT IS WITHOUT A FAULT. ONE MOTION DOES IT ALL.
Every machine is tested and warranted to give satisfac-
tion. We confidently offer this upsetter as the best to be
had.

BUTTS & ORDWAY,

MANUFACTURERS,

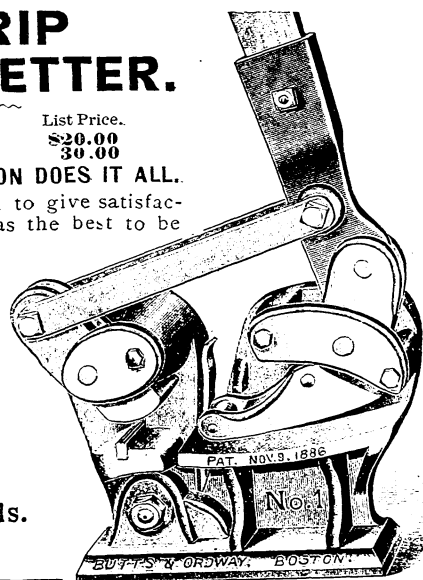
500 Atlantic Avenue,

BOSTON.

ALSO DEALERS IN

Heavy Hardware.
Iron and Steel.
Carriage and Wagon Wheels.
Contractors' Supplies.

— SEND FOR CATALOGUE. —

**THE COULTER & MCKENZIE MACHINE CO.,**

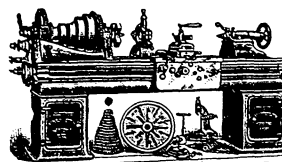
BRIDGEPORT, CONN.

**TAPER ROLLING MACHINES and
SPECIAL MACHINERY.****FITCHBURG MACHINE WORKS,**

MANUFACTURERS OF THE CELEBRATED

FITCHBURG

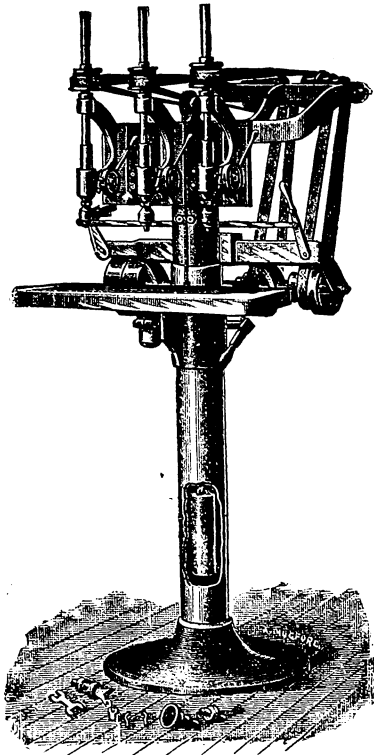
AND OTHER

SEND FOR
CATALOGUE B.

18-inch Engine Lathe.

ENGINE LATHEMETAL-WORKING MACHINES,
**FITCHBURG,
MASS.**

PATENT RAW HIDE BOUND MALLETS & CHISEL HANDLES
POSITIVELY WILL NOT SPLIT.
PATENT RAW HIDE PINIONS
ESPECIALLY ADAPTED TO HIGH SPEED MACHINERY. NOISELESS
MORE DURABLE THAN METAL. NO LUBRICANT REQUIRED.
NEW PROCESS RAW HIDE CO.
PATENTEES & SOLE MANUFACTURERS SYRACUSE N.Y., U.S.A.

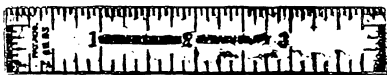
SIGOURNEY DRILLS.**IMPROVED.**

**Sensitive, Strong and Interchangeable
One, Two and Three Spindles.**

Counter-balanced Spindles and Tables. Vertical range of table, 30 inches, and it will swing to right or left.

SEND FOR CIRCULAR.

**THE SIGOURNEY TOOL CO.,
Hartford, Conn.**



MACHINISTS' SCALES
PATENT END GRADUATION.

Liberal Discount to the Trade. Send for List.

COFFIN & LEIGHTON, Syracuse, N. Y.

LIGHT DRILL PRESSES
THE LARGEST
VARIETY
SEND FOR NEW
80 PAGE CATALOGUE
JUST OUT
DWIGHT SLATE
MACHINE CO.
HARTFORD, CONN.

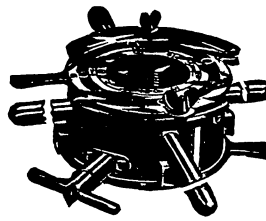
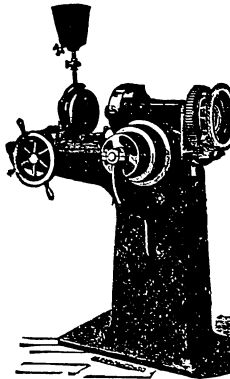
ARMSTRONG MAN'G. CO.

BRIDGEPORT, CONN.

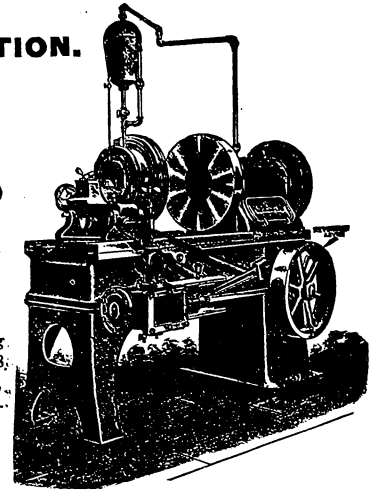
OUR ADJUSTABLE STOCKS and DIES are universally acknowledged to be the BEST! We also make all our Tools on the same principle, of the Best Material and Workmanship, and always with a view of time and labor saving in their use.

JARECKI MFG. CO. (Limited), Erie, Pa.

**PIPE THREADING AND
CUTTING TOOLS OF
ALL DESCRIPTION.**



Write for Catalogue showing the most complete line of 1-8 inch to 16 inch for hand, belt, engine and with electric motor attachment.



We can furnish Bolt Threading Attachment for this Machine.

W.W. MINER G.W. PECK S. PECK.

MINER & PECK M'FG CO.,
SUCCESSORS TO
BEECHER & PECK,
SOLE MANUFACTURERS OF
THE PECK PATENT DROP PRESS
DROP FORGINGS, BLAST FORGES.
NEW HAVEN, CONN.

SLIP ROLLER.

others, less complex and more easily handled. The front bearings open by lever A, which is keyed on to shaft reaching to opposite end of the roll, with eccentric on same. By opening front bearing the eccentric pulls down back roll and raises front part by one operation. We also make Boiler Makers' Rolls and a full line of Punching and Shearing Machinery. Write for Catalogue.

THE WAIS & ROOS PUNCH & SH AR CO., CIN., O.

The engraving illustrates our new Slip Roller just put on the market. It is superior to all

**STEEL BALLS**

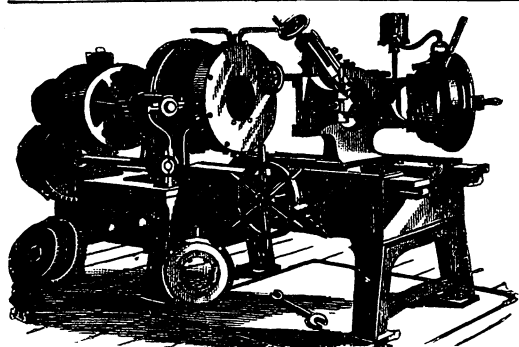
For all purposes, from Bicycles to the heaviest class of machinery. Write to us for prices and samples, also for information when in doubt about the proper application of balls to heavy bearings.

GRANT ANTI-FRICTION BALL CO.,
Fitchburg, Mass.



Bullock Bellows Co.,
Cleveland, Ohio.

**Largest
Mfrs.
in the
World**



D. SAUNDERS' SONS,

—MANUFACTURERS OF—

Pipe Cutting and Threading Machines

For Pipe-Mill and Steam Fitters' Use. Tapping Machines for Steam Fitting. Also Steam and Gas Fitters' Hand Tools.

—SEND FOR CIRCULARS.—

No. 25 Atherton Street, - YONKERS, N. Y.

INSTANTANEOUS CLUTCH.

NO LOST MOTION.

MADEFORSERVICE.

FRICITION DRILL-STOCK,

DROP-FORCED FROM STEEL.

SEND FOR ILLUSTRATED CATALOGUE.

Smith Friction Drill & Tool Co., BOSTON, MASS.

RICHARD DUDGEON.

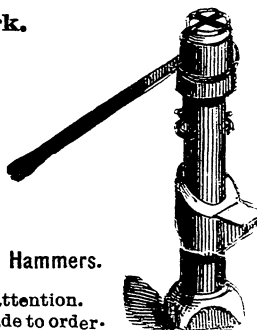
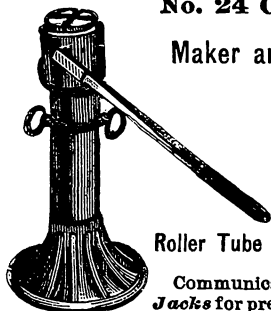
No. 24 Columbia Street, New York.

Maker and Patentee of the Improved

Hydraulic Jacks AND Punches.

Roller Tube Expanders and Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.
Jacks for pressing on Car Wheels or Crank Pins made to order.



ILLINOIS IRON & BOLT CO.,

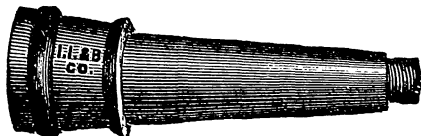
Nos. 20 to 26 Main Street,

CARPENTERSVILLE. KANE CO., ILL.

MANUFACTURERS OF

BLACKSMITHS'

TOOLS,



SCREWS,

JACK

THIMBLE SKEINS,

SAD IRONS

COPYING PRESSES AND STANDS. &C.

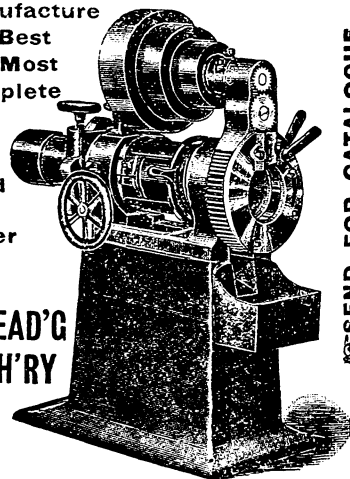
The Merrill Manufacturing Co.,

TOLEDO, O.

Manufacture
The Best
and Most
Complete
Line
of

Hand
and
Power

PIPE
THREAD'G
MACH'RY
IN
USE.

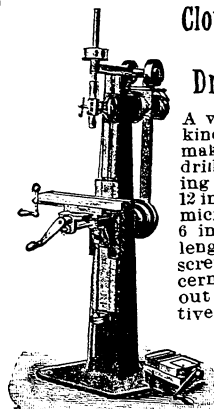


SEND FOR CATALOGUE

Clough's Vertical Miller
AND

Drill Press Combined.

A valuable machine for all kinds of Die work and Tool making, requiring milling, drilling and profiling. Sliding table instantly adjusted 12 in. on column. Table has micrometer adjustment of 6 in., 12 in. and 18 in. cross, lengthwise and vertically by screw. No enterprising concern can afford to do without this machine. Descriptive circular and prices sent on application.



R. M. CLOUGH,
TOLLAND CONN.

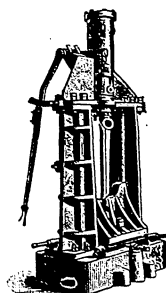
Corporation Stops

—FOR—

HADESTY and other Tapping Machines.

Write for prices to

ANTHRACITE BRASS WORKS,
Tamaqua, Pa.



STEAM POWER

DROP

PRESS.

NEW DESIGN.

FOR STAMPING SHEET METAL.
CAN TAKE IN PLATES 26 IN. WIDE.
WEIGHS, 7,250 LBS.

VULCAN IRON WORKS,
CHICAGO.

Ferracute Machine Co.

BRIDGETON, N. J., U. S. A.,

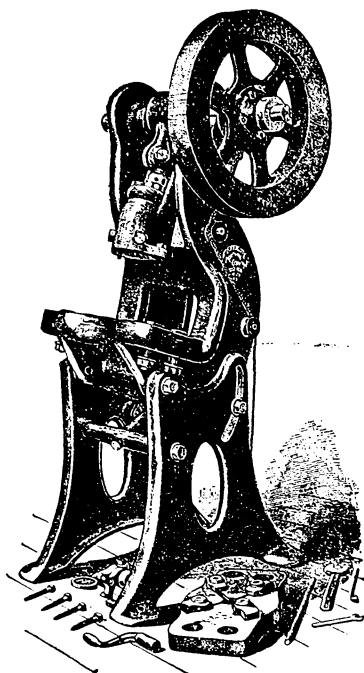
MANUFACTURERS OF

FOOT AND POWER

PRESSES, DIES,

AND ALL OTHER

Tools for Bar and Sheet Metals



Send for Illustrated Catalogue containing sizes, weights and prices of one hundred kinds of Presses and other Tools for Brass Goods, Locks, Hardware, Nuts, Washers, Drop Forgings, Railroad, Bridge and other General Machine Shop Work, &c. Also for Tinware, Cans, Boxes, Lamps, Gas Fixtures and Silverware, &c., &c.

Practical Blacksmithing

Vols. I, II, III and IV.

5½ x 7½; cloth; per vol.....\$1.

This work consists of a collection of articles contributed at different times by skilled workmen to the columns of the *Blacksmith and Wheelwright*, and covers nearly the whole range of blacksmith work, from the simplest jobs to the most complex forgings.

Sent, postpaid, on receipt of price, by
DAVID WILLIAMS, Publisher and Bookseller
96-102 Reade St., New York.

Perfect Tire Shrinkers.

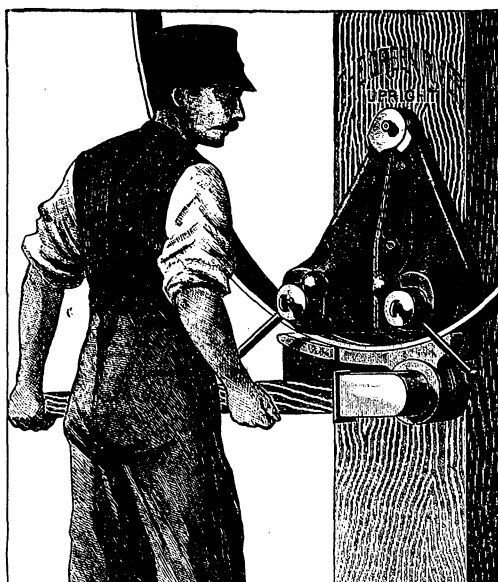
SIMPLE, STRONG AND DURABLE.

Also Lightning and Green River Screw Plates, Taps, Dies, Reamers and other Labor-saving Machinery and Tools.

MADE BY

Wiley & Russell Mfg. Co.,
GREENFIELD, MASS., U. S. A.

SEND FOR NEW CATALOGUE.



Don't Buy

**Maule's "Skeleton" Pipe Die*

If You Wish to Avoid

A Pipe-Threading Die extremely easy of operation by reason of the **proper clearance** of its cutters;

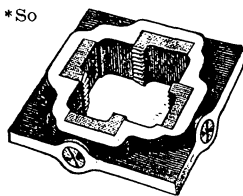
Of surpassing **durability** secured by the accurate and uniform temper of said Cutters;

Having Cutters that when dull may be removed in a moment, and **sharpened on a grindstone or emery wheel**;

Of phenomenal **cheapness**, arising from small first cost coupled to excellence of quality.

If by chance you do not think these points, or the saving of money, objectionable,

*So



Send us a Postal Note for 62 Cents (do not send us any postage stamps), and we will mail you a sample one-inch Die, either 2¾ or 2½ x ¾ thick, which we hereby agree to take back if not to your satisfaction.

PANCOAST & MAULE,
PHILADELPHIA, U. S. A.

SEND FOR CATALOGUE OF THE "SKELETON" PIPE DIE.

Wire Drawing Machines, WATERBURY Gang Slitters,

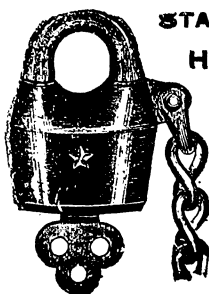
Power Presses and Dies, Waterbury, Conn.,

Tumbling Barrels,

Special Machinery.

MANUFACTURERS.

Send For Prices.



STAR LOCK WORKS, PHILA.

HILLEBRAND & WOLF,

MANUF'RS OF

1ST QUALITY ONLY

SCANDINAVIAN

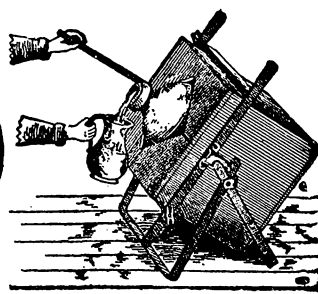
AND

SPRING PADLOCKS

TRUNK & CASE LOCKS

CARBOY STANDS, &c.

CATALOGUES SENT ON APPLICATION.



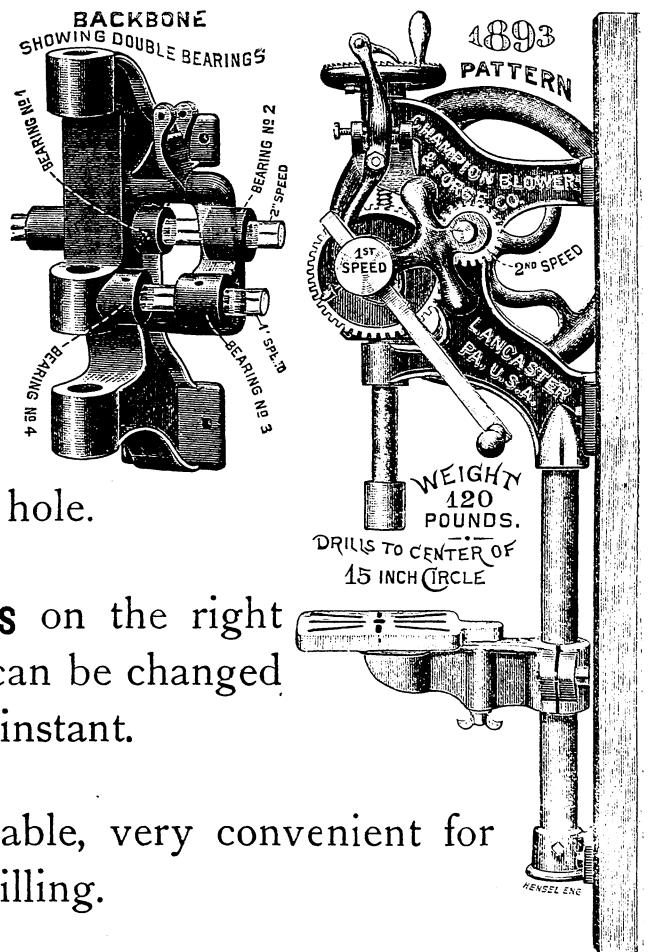
OUR 1893 PATTERN.

THE LATEST. THE BEST. THE CHEAPEST.

\$10. THE WORLD'S CHAMPION
SELF FEED POST DRILL. **\$10.**

5 POINTS NOT FOUND IN ANY OTHER DRILL FOR \$10.00.

- 1st. Actual Weight, 120 lbs.
- 2d. Double Journal Bearings, with Double Back Gears.
- 3d. Drills to center of a 15-inch Circle and from $\frac{1}{64}$ to $1\frac{1}{4}$ inch hole.
- 4th. Has two true and honest speeds on the right hand side of the drill which can be changed from one to the other in an instant.
- 5th. Has a large, square Slotted Table, very convenient for securely bolting work for drilling.



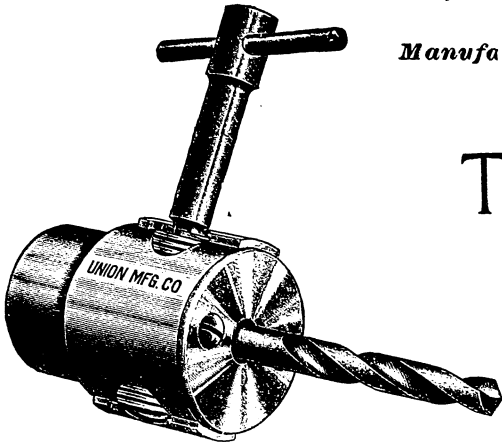
N. B.—As we are the PIONEERS in \$10.00 Drills (which fact the world knows) we take pleasure in saying our trade has increased in them to such enormous proportions that with the great quantity of sales and late improved specially-made machinery, we are once more able to furnish an improved drill in our 1893 Pattern, which so far surpasses our past efforts that words here cannot do it justice.

EVERY DRILL WARRANTED.

SEND for our illustrated catalogue, containing over 200 styles of tools.

THE CHAMPION BLOWER & FORGE CO.,
LANCASTER, PA., U. S. A.

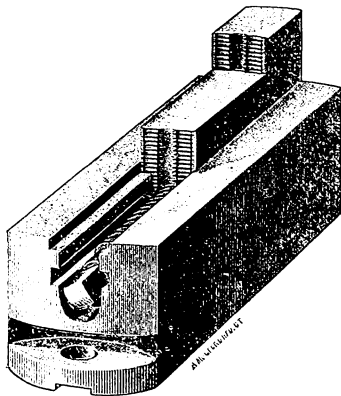
UNION MANUFACTURING COMPANY, .'. NEW BRITAIN, CONN.
WAREHOUSE, 103 CHAMBERS ST., NEW YORK.



Manufacturers of Combination, Universal, Independent, and Combination Reversible Jaw Chucks.

THE UNION DRILL CHUCK.

NUMBER.	DIAMETER.	HOLDING.	LIST.
100	2¼ inches.	0 to ½ inch.	\$8.00
101	2¾ " "	0 to ¾ inch.	9.00
102	3½ " "	0 to 1 inch.	10.00



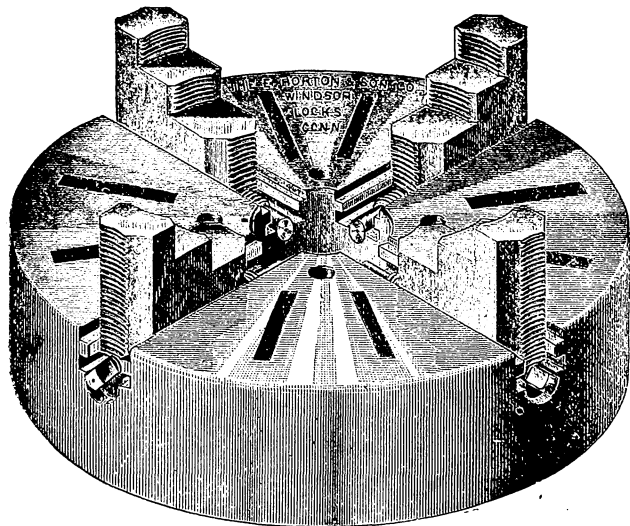
LARGE CHUCKS FACE-PLATE JAWS

- Are expensive.
- Are inconvenient to handle.
- Require a face-plate to be made for them, or they have to be threaded to fit the spindle.
- Are a perfect substitute.
- Are inexpensive.
- Are easily handled by one man and fit right on to the face-plate that is furnished with the lathe.

Send for special circular regarding these jaws. We have them for lathes of 30 inch swing and up. They are also used on Boring Mills and Drill Presses.

We Manufacture a Full Line of Chucks for all Purposes.

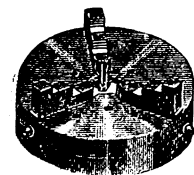
THE CUSHMAN CHUCK CO., Hartford, Conn



IMPROVED INDEPENDENT CHUCK.

This cut represents a line of Improved Independent Reversible Jaw Chucks that we have lately added to our large list of Universal and Combination Chucks. We make this style of Chuck in **twenty-two sizes**, varying in size by two inches from **four to thirty-eight inches** in diameter. Send for Illustrated Price-List.

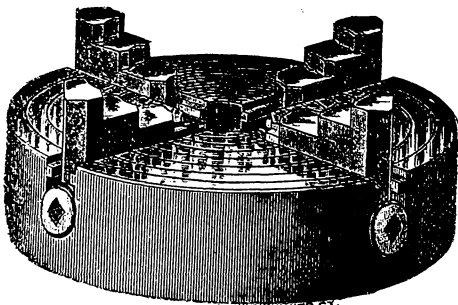
THE E. HORTON & SON CO., Windsor Locks, Conn., U. S. A.
Or **CHAS. CHURCHILL & CO., 21 Cross Street, Finsbury, London, E. C., England.**



SKINNER CHUCKS.
Independent, Universal and Combination Lath Chucks
Also DRILL CHUCKS.
Skinner Chuck Co.,
NEW BRITAIN, CONN.

Send for CATALOGUE.
AMERICAN FOUNDRY PRACTICE
Treating of Loam, Dry Sand and Green Sand Molding, and containing a Practical Treatise upon the Management of Cupolas and the Melting of Iron. By **THOMAS D. WEBB.** Price, \$2.50. Sent, post-paid, on receipt of price by **DAVID WILLIAMS, Publisher and Book-teller 96-102 Reade St. New York.**

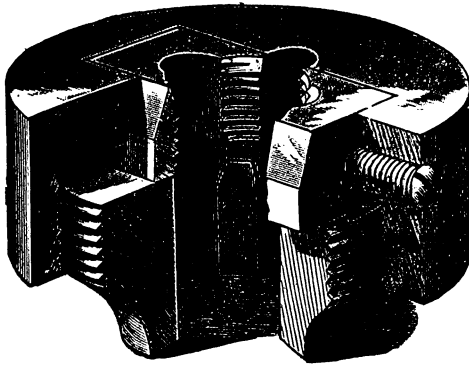
CHAMPION INDEPENDENT CHUCKS.



An entirely new line of small Chucks, provided with 3 or 4 independent reversible steel jaws. The best Chuck in the market for foot lathes. Ask your dealer for them or write to us.

THE D. E. WHITON MACHINE CO.
Sole European Agent **SELIG SONNENTHAL & CO., London.** New London, Conn.

"LITTLE GIANT."



Patented February 3d, 1885.
SECTIONAL VIEW OF DIE AND COLLET.

ADJUSTABLE DIE AND COLLET.

To adjust simply turn screws at end of dies *in or out*, as the adjustment desired requires.

SIMPLE, STRONG AND DURABLE.

SOMETHING FOR NOTHING.



in Every assortment of our
NEW LITTLE GIANT SCREW PLATES we put in our latest improvement in adjustable TAP WRENCHES at no extra expense to purchaser.

TWO AND A HALF DOLLARS' WORTH OF TOOLS FOR NOTHING

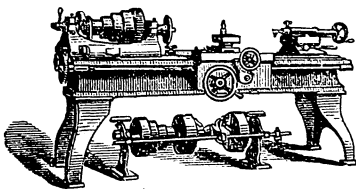


MANUFACTURED BY WELLS BROS & CO., GREENFIELD MASS.
Send for latest illustrated Catalogue of Screw Cutting Tools.

Ask your dealer for
New Little Giant Screw Plate with
Tap Wrench.
Same list prices as heretofore.

THE PRATT & WHITNEY CO., Hartford, Conn., U. S. A.

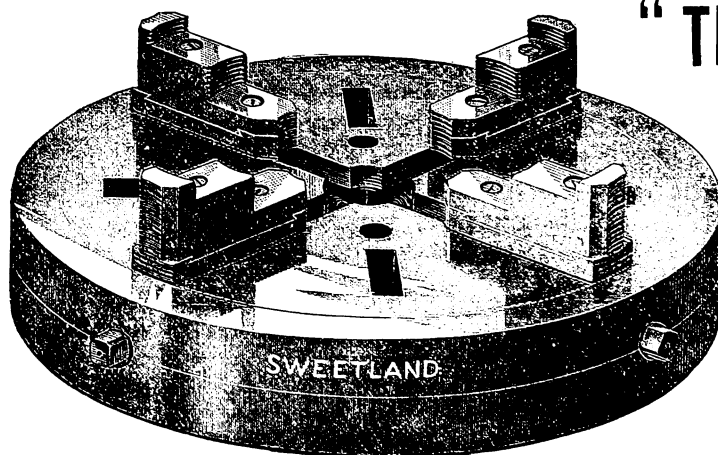
Manufacture Machinists' Tools and Special Machinery. Simplicity in Design, Thoroughness in Construction and Durability are Characteristics of the Machines.



The kinds made and usually carried in stock comprise Hand, Engine, Cutting Off Turret Head Chucking, Grinding and Centering Lathes, Planers, Shapers, Drilling, Gear Cutting, Milling, Cutter Grinding Machines and Milling Machines in great variety.

Screw making, Slotting and Shaving Machines; Bolt Threading and Nut Tapping Machines, Drop Hammers, Die Sinkers, Trimming Presses, Shears, Vises and Centers for Planers and Milling Machines; Chucks for lathes, screw machines and bolt cutters; Renshaw Ratchet Drills; Screw Plates; Hand, Machine, Pulley, Pipe and Stay Bolt Taps; Hand, Chucking, Shell, Pipe and Locomotive Taper Reamers, Standard Size Cylindrical and U. S. Standard Thread Gauges.

Ask for "Hardware Catalogue."



"THE SWEETLAND CHUCK."

WITH NEW PATENT REVERSIBLE JAWS.

UNIVERSAL.

INDEPENDENT.

ECCENTRIC.

CONCENTRIC.

SIMPLEST.

REVERSIBLE.

STRONGEST.

MOST ACCURATE.

MOST DURABLE.

BEST!

IMITATED BUT NEVER EQUALED.

Send for Catalogue. Write for Discounts.

THE HOGGSON & PETTIS MFG. CO., Sole Mfrs.

ESTABLISHED 1849.

64, 66, 68 and 70 COURT STREET, NEW HAVEN, CONN.



Sectional View Collet.



All Sizes to 1 1/4 inches diameter.

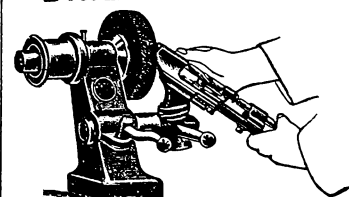


Machine Nut Tap.



Hand Nut Tap.

DRILL GRINDER.



THE WASHBURN SHOPS,
WORCESTER, MASS.

The Mechanical and Other Properties of Iron and Steel in Connection with their Chemical Composition. By A. VOSMAER. 203 pages, cloth, \$2.50
For Sale by David Williams, 96-102 Reade St., N.Y.

BUTTERFIELD & CO., Derby Line, Vt.,
Manufacturers of SCREW-CUTTING TOOLS In Great Variety.

WRITE FOR ILLUSTRATED CATALOGUE.

THE STANDARD TOOL CO., CLEVELAND, OHIO.

MANUFACTURERS OF

Increase Twist Drills, Reamers, Taps, Milling Cutters and Chucks.

Taper Shank Drills,
St. Shank Drills,
Screw-driver Bits,
Reamers,
Shell and Solid
Taper Reamers.



Bit Stock Drills for Metal or Wood.



Wood-Boring Brace Drills, will cut off nails.

Hand Taps,
Mach. Screw Taps
"Standard" Drill
Chuck,
"Ellenwood" Drill
Chuck,
Sq. Shank Drills
for Ratchets,
Twist Drills for
Blacksmiths'
Presses

Sockets for
Taper Shank
Drills.

Reamers in
all sizes.

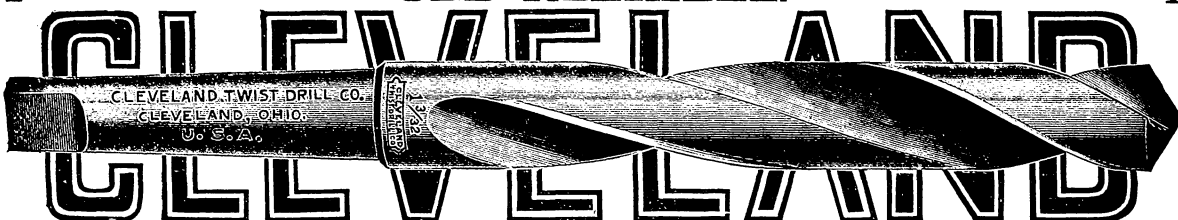
NEW YORK OFFICE, 33 CHAMBERS ST. Send for Catalogue

1874

OLD RELIABLE.

1893

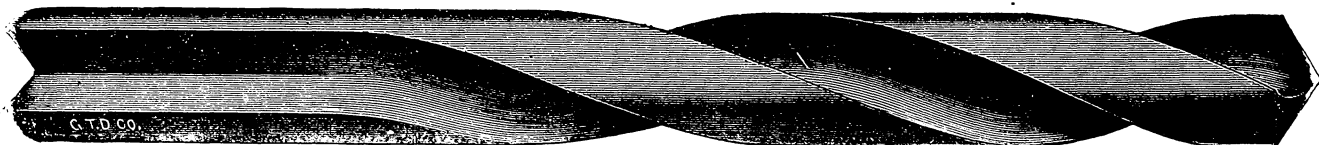
Send For Catalogue.



Write For Discounts.

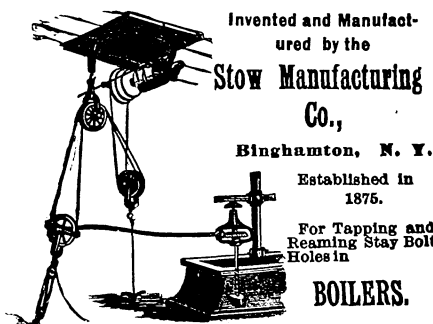
Graham Twist Drill & Chuck Co., Detroit, Mich., U.S.A.

Sole Manufacturers of Graham's Patent Grooved Shank Twist Drills and Chucks.



Endorsed by Practical Mechanics everywhere. Send for Catalogue and Prices.

Stow Flexible Shaft



Portable Drilling.

Invented and Manufactured by the
Stow Manufacturing Co.,

Binghamton, N. Y.

Established in
1875.

For Tapping and
Reaming Stay Bolt
Holes in

BOILERS.

Thos. H. Dallett & Co.

York St. and Sedgley Ave.,
PHILA.

MANUFACTURERS OF
Portable Drills, Hand
Drills, Boiler Shell Drills
Electric Motors specially
adapted for driving Ma-
chine Tools, Cranes, Ele-
vators, Pumps, Presses and
other machinery.

Electric Generators for installa-
tion of complete power plants.

Stow Flexible Shaft Co., Limited,

26th, Callowhill & Biddle Sts.,
PHILA., PA.,

Manufacturers of

**PORTABLE DRILLING,
TAPPING, REAMING
and BORING MACHINES**

Also Tools for Emery Wheel
Grinding, Metal and Wood Pol-
ishing, Cattle Brushing and
Clipping, &c.

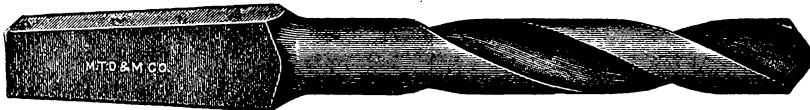
Gen'l European
Agents.

Bolling & Lowe,
2 Lawrence,
Pountney Hill,
LONDON, ENG.



Morse Twist Drill & Machine Co., NEW BEDFORD, MASS.

Manufacturers of *Morse Pat. Straight-Lip Increase Twist Drills,*



Bit Stock Drills, Solid and Shell Reamers, Drill Grinding Machines,

Milling



Cutters,

Beach's Patent Self-Centering Chucks, and Special Tools to Order.



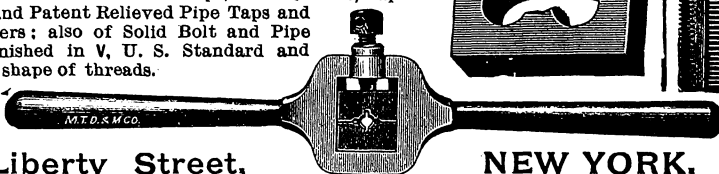
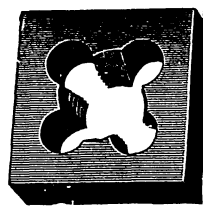
ALL TOOLS EXACT TO WHITWORTH STANDARD GAUGES.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



Manufacture of Patent Machine Relieved Nut, Hand,
Blacksmith and Machine Screw Taps, Screw Plates, Tap
Wrenches and Patent Relieved Pipe Taps and
Pipe Reamers; also of Solid Bolt and Pipe
Dies. Furnished in V. U. S. Standard and
Whitworth shape of threads.



111 Liberty Street,

NEW YORK.

HAVE YOU EVER HEARD OF



THE WONDERFUL FORSTNER AUGER BIT ?

If not, it will pay you to send for a sample 4-8 bit and price-list. Sent on receipt of 55 cents. It will bore
Round, Oval and Square Holes, and cannot be equalled for fine carpentry, cabinet or pattern work. Discount
to dealers on application.

FOR SALE BY ALL HARDWARE DEALERS.

Depot for Sales.

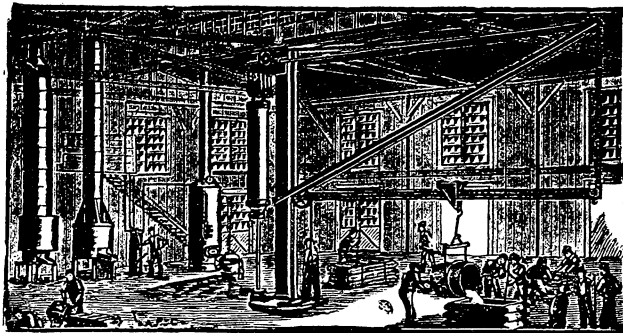
THE BRIDGEPORT GUN IMPLEMENT CO.,
313 and 315 Broadway, New York

ALL WE ASK.-

If you need a crane for any purpose, go and see **RIDGWAY STEAM-HYDRAULIC** in use. This will settle you. Look over the list. You know some of them, we guess. Don't fool your money away on inferior cranes. Neither can you afford to move goods by hand power in these times. Look at the List.

No mistake made following these:

Fraser & Chalmers.
Otis Bros. & Co.
Gaar, Scott & Co.
Geo. V. Cresson Co.
American Steel Wheel Co.
Shickle, Harrison & Howard.
The Sterling Co.
Canda Mfg. Co.
Aliquippa Steel Co.
I. G. Johnson & Co.
Montgomery Fur. Co.
Reading Iron Co.
Hoopes & Townsend.
Valk & Murdoch.
B. Atha & Ill'w'th Co.
Hughes & Patterson.
Sherman & Co.
Murray Iron Works.
Rensselaer Mfg. Co.
Benwood Steel Co.
Clinton I. & S. Co.
Oliver I. & S. Co.
Moorhead-McCleane.
Jones & Laughlin.
Spang S. & I. Co.
Apollo S. & I. Co.
Johnson Co.
Cambria Iron Co.
Old Dominion I. & S. Co.
Standard Iron Co.
Norristown Steel Co.
Midland Steel Co.
Farren & Co.
Pearson & Co.
Morton, Reed & Co.



Cut shows 5-ton Ridgway Crane in Foundry, Diamond State Iron Co., Wilmington, Del.

THE IDEAL FOUNDRY CRANE.

Foreman of the largest and finest equipped foundry in the United States, if not in the world, says: "It is the greatest crane for a foundry I ever saw or heard tell of. Ours do all promised for them."

A FACT—AND A CLINGER.

No man needing Cranes who has gone to see ours in operation has failed to place his order with us for this wonderful machine.

QUICK.

It does the work while other cranes are getting ready to do it. Is noise, less. No shocks or jars and is attached to ordinary steam supply. Any and all men around the place work it. Steam used is never missed.

SEND FOR CIRCULAR.

Give pressure, capacity, radius and height of building and we will name prices.

CRAIG RIDGWAY & SON, Coatesville, Pa.

No mistake made following these:

Penna. Steel Co.
Illinois Steel Co.
National Tube Works.
Henry Disston & Sons Co.
Phoenix Iron Co.
A. & P. Roberts Co.
Passaic R. M. Co.
Catasauqua Mfg. Co.
Mahoning R. M. Co.
Harrisburg R. M. Co.
Harrisburg Car Co.
Wm. Neal & Son.
Atlantic Refining Co.
E. & G. Brooke Iron Co.
Wm. L. Bailey & Co.
Glasgow Iron Co.
W. W. Kurtz & Sons.
Kilmer Mfg. Co.
Port Henry Fur. Co.
Akron Iron Co.
Crane & Breed Co.
Diamond S. Iron Co.
J. W. Friend & Co.
National P. & F. Co.
West Superior I. & S. Co.
Hartman Mfg. Co.
Shoenberger & Co.
Chester R. M. Co.
Garwood Imp. Co.
Blankley Bros. & Co.
New Haven Wire Co.
American Wire Nail Co.
John Brennan & Co.
Buffalo Cast Iron Pipe Co.
John Q. Denny.

THE WOODRUFF SYSTEM OF KEYING FOR MACHINERY

Does not require skilled labor to cut key way or fit key.

The peculiar way of inserting the key practically makes it part of the shaft.

A man will fit more than double the number of keys in a day than by the ordinary method.

Will save you from 50 to 75 % on the cost of your keying.

ENDORSED BY MECHANICS AND ENGINEERS.

Illustrated pamphlet containing a full description will be sent free on application.

THE WOODRUFF MFG. CO., Hartford, Conn.

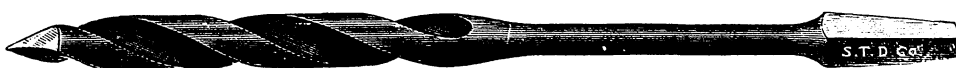
Our Drills are Hot Forged. The best part of the steel IS NOT CUT OUT and thrown away.



They are **TOUGHER, STRONGER, BETTER** than is possible to attain by milling. Catalogue and Discounts sent on application.

Drills for Wood
& Metal, Counter-
sinks, Screw
Drivers, Chucks,
&c., for sale by
the trade.

Syracuse Twist Drill Company,
SYRACUSE, N. Y.



Every tool fully
Guaranteed.
Beware of im-
itations.



MINER'S POCKET-BOOK,

a reference book for miners, mine surveyors, geologists, mineralogists, millmen, assayers, metallurgists and metal merchants all over the world. SYNOPSIS OF CONTENTS: Motive Power; Transmitting Power; Prospecting; Tools; Drilling; Blasting; Shaft Sinking; Pumping; Ventilating; Lighting; Coal Cutting; Hauling and Hoisting; Ore Dressing; Mine Surveying; Assaying; Glossary. With numerous tables, and a complete index.

By **C. G. WARNFORD LOCK,**

472 PAGES, ILLUSTRATED, FLEXIBLE LEATHER, \$5.00

Sent, Postpaid, upon receipt of Price, \$5.00, by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., New York.

BONNELL'S NUBIAN

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUB

BONNELL'S NUBIAN

"RICHES AND HAPPINESS"

The two things we are all looking for. We have a good receipt for you to follow: Buy Nubian, you'll get "the best black on earth" and be happy, and incidentally we'll accrue a little filthy lucre, and that, to tell you the truth, is what we are most interested in. **Bonnell's Nubian** is made in all grades from cheapest to best and every grade guaranteed. If you now use asphaltum, write us, it will pay you.

HALL & CARPENTER, Phila., Pa.
BROWN, McCURE & WALES, Boston, Mass.
TAYLOR GOODRICH, San Francisco, Cal.

THE NUBIAN IRON ENAMEL CO.,33-35 Nubian Ave.,
CRAGIN, ILL.

NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUBIAN BONNELL'S NUB

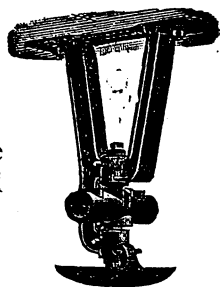
You Seldom Do;

But then you have never thought of the vexatious delays, to say nothing of time lost and annoyance, caused by not having on hand a supply of our justly famed

Pulleys, Hangers, Journal Boxes, Wall Brackets, &c.

—ADDRESS—

J. W. FOLEY & CO., 329-337 W. Front St., Cincinnati, O.

Manufacturers and Gen.
Founders.

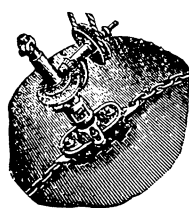
Portable Drilling Machines

Manufactured by

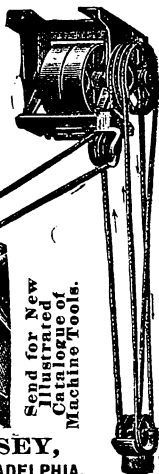
ALBERT L. COLBURN,

4 Wall St., New Haven, Conn

SEND FOR CATALOGUE.



Portable Drill, as ap-
plied to drilling the
shells of boilers.



Send for New
Illustrated
Catalogue of
Machine Tools.

JAMES T. HALSEY,
26th and Callowhill Sts., PHILADELPHIA.

DUNHAM NUT MACHINE CO.,

Unionville, Conn.,

Manufacturers of

AUTOMATIC COLD PRESS NUT MACHINE;

FOR MAKING CHAMFERED AND TRIMMED NUTS

Correspondence Solicited.

The Practical Catechism. A collection of questions on technical subjects, by manufacturers and others, and of answers thereto. By ROBERT GRIMSHAW, M.E., Ph.D. Treating of Miscellaneous engineering questions, and touching upon physical science, chemistry, etc. GENERAL TOPICS: Properties of Air; Alloys; Beams; Belts; Bricks; Building; Building Stones; Calculations; Cements; Chemical Processes; Coloring Metallic Objects; Combustion; Disinfectants; Fastenings; Fluxes; Foods; Foundry Practice; Fuels; Gas; Gear Wheels; Gravity; Hardening; Tempering and Annealing; Heating; Hydraulics; Iron and Steel; Limes, Mortars and Cements; Locomotives; Lubrications; Mechanical Processes; Metals in General; Millwrighting; Paints; Oils and Varnishes; Plants; Power; Railways; Ropes; Saws; Shafting; Solders; Strength of Materials; Sugars; Temperatures; Timber and Trees; Ventilation; Waters; Weights; Wines; Work; Miscellaneous. 296 pages, cloth.....\$1.25

For Sale by DAVID WILLIAMS, 96-102 Reade St., N.Y.,

COPELAND & BACON

HOISTING & WINDING ENGINES

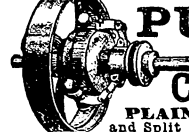
ORE CRUSHERS, ORE WASHERS, CONCENTRATING MACHINERY, GRAVITY INCLINES, STONE CRUSHERS, RAILROAD CRANES.

85 LIBERTY ST., NEW YORK. 62 SO. CANAL ST., CHICAGO.

J. H. & D. LAKE CO., Massillon, Ohio, U.S.A.

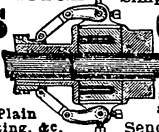
Manufacturers of FRICTION CLUTCH

Simplest, Strongest and Best

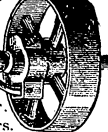


PULLEYS
and CUT-OFF
COUPLINGS

PLAIN AND SPLIT, also Plain
and Split Pulleys, Hangers, Shafting, &c.



CLUTCH PULLEY
made. Adapted
to light or heavy
work, stopping and
starting machines easily
and quickly without jar.



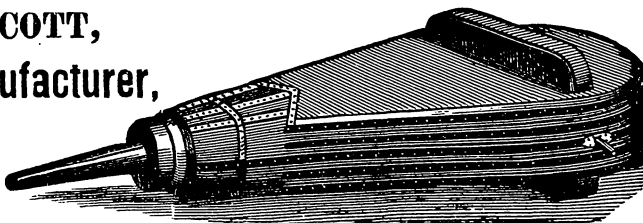
Send for illustrated circulars.

GEO. M. SCOTT,**Bellows Manufacturer,**

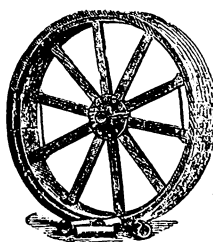
Johnson Street

Cor. 22d St.,

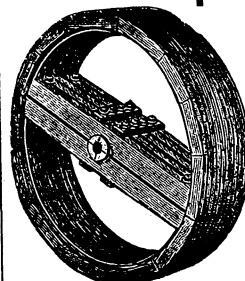
CHICAGO ILL.

**KEASEY PULLEY Wood Split Pulley.**

Is a Split Pulley. Has narrow Arms. An Iron Hub. Better surface and will transmit more power than an Iron Pulley. To try them is to use no other.

**HAVE YOU
TRIED THEM?**

If not, do so. It's to your interest.
Manufactured only by
**The GREAT WESTERN
PIN CO.,
TOLEDO, OHIO.**



**Strongest,
Lightest,
Simplest,
Cheapest**

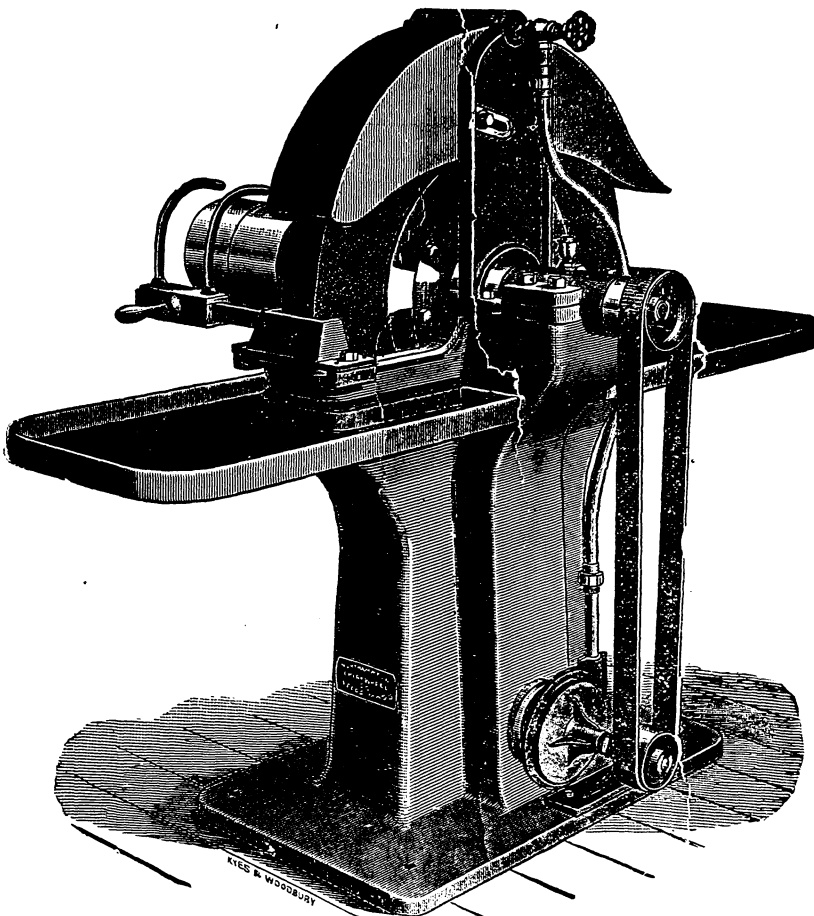
Wood split pulley in the world. Satisfaction guaranteed. Write for price-list and descriptive Catalogue. Address

REEVES PULLEY CO.,
1220 E. 7th Street, - COLUMBUS, IND.
New York Agents,
Patterson, Gottfried & Hunter, 146-150 Centre St.

ESTABLISHED 1887.

NORTHAMPTON EMERY WHEEL CO.,
LEEDS, MASS., and 20 So. Canal Street, CHICAGO,
Manufacturers of

CAPITAL \$100,000



WATER TOOL GRINDER.

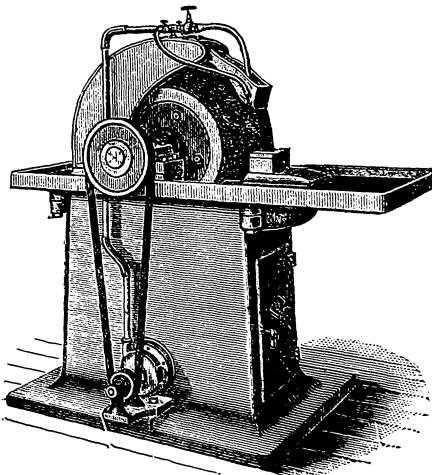
EMERY WHEELS AND EMERY WHEEL MACHINERY
OF BEST QUALITY.

Send for Catalogue.

FACTORY AT LEEDS, MASS.

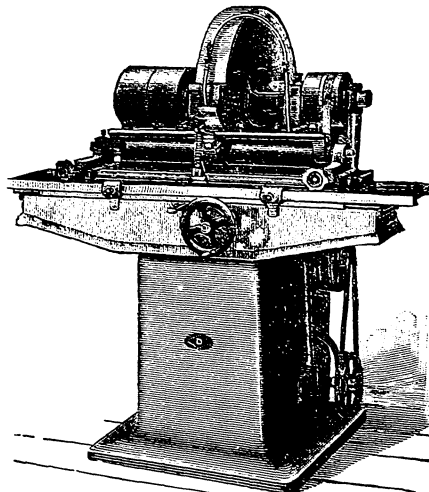
WATER TOOL GRINDERS.

KNIFE GRINDERS.



No. 2 uses wheel 18 inches x 2 1/4 inches.
No. 3 " " 24 " " 3 1/4 "
No. 4 " " 30 " " 4 "
No. 5 " " 36 " " 4 "

SEND FOR CATALOGUE AND PRICES.



Only Practical Knife Grinder on the market using water on the wheel effectively to prevent drawing temper from knives. Made to grind knives up to 144 inches in length.

DIAMOND MACHINE CO.,

CHICAGO, ILLS.

PROVIDENCE, R. I.

BOOKS

THE NEWEST BOOKS ON Iron, Steel and Metallurgy Mining, Mechanical and Civil Engineering; Casting and Founding; Electricity and Electric Lighting, promptly supplied on receipt of price by
DAVID WILLIAMS, 96-102 Reade St., New York.

A POINTER

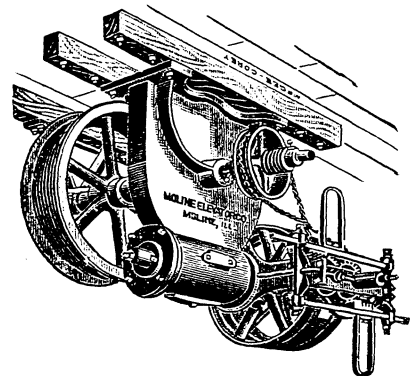


To **SAVE** you **FREIGHT** We keep in stock everything in the grindstone line at our branch yards, Chicago, Ill., Boston, Mass., and 283 Front Street, New York.

Send for Catalogue D.

The Cleveland Stone Co.,
CLEVELAND, OHIO.

MOLINE ELEVATOR CO.



MANUFACTURERS OF
**POWER ELEVATORS,
HAND ELEVATORS
and DUMB WAITERS.**
WRITE FOR PRICES AND CIRCULARS.
MOLINE ILL.

ELEVATORS,

HAND AND BELT
POWER.

"VARIETY"

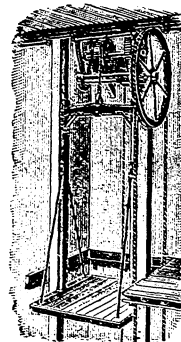
Hand Elevator

HAS

Automatic Clutch,
Roller Bearings,
Machinery fastened to-
gether in Iron Frame.
Prices on any ma-
chine furnished on ap-
plication to

Variety Machine Co.

Warsaw, N. Y.



PATENTED

ZELLER'S AUTOMATIC GATES

—FOR—

ELEVATORS.

Self-Opening.

Self-Closing.

SIMPLE and DURABLE.

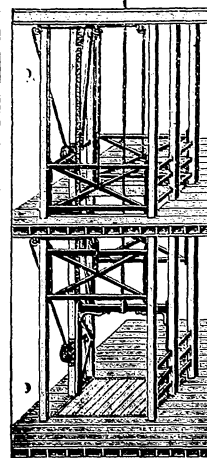
Send for illustrated
catalogue and prices.

RICHMOND

SAFETY

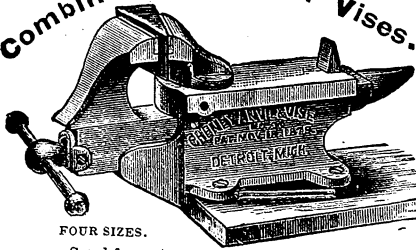
GATE CO.,

RICHMOND, IND.



CHENEY'S

Combined Anvils and Vises.



FOUR SIZES.

Send for catalogue and discounts.
Fulton Iron and Engine Works,28 Brush St., Detroit, Mich.
ESTABLISHED 1852.

A WORD TO THE WISE.

Our ELECTRIC MOTORS

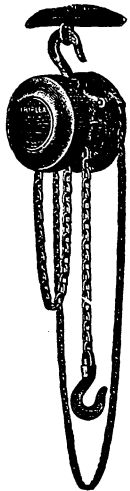
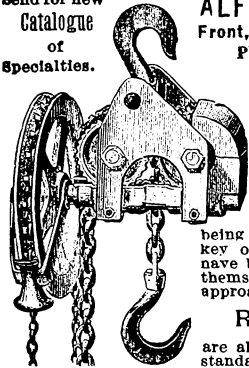
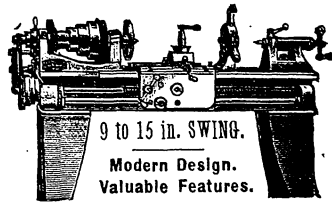
are operating numerous

**IRON AND STEEL MILLS AND MACHINE SHOPS ECONOMICALLY,
SUCCESSFULLY AND SATISFACTORILY.**

WRITE FOR OUR ILLUSTRATED CATALOGUE.

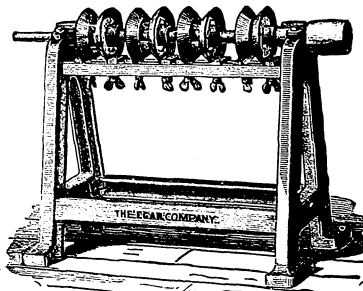
THOMSON-HOUSTON MOTOR COMPANY

BRANCH OFFICES:

44 Broad St., New York.
620 Atlantic Ave., Boston, Mass.
173 & 176 Adams St., Chicago, Ill.509 Arch St., Philadelphia, Pa.
Fifth and Race Sts., Cincinnati, O.
401-407 Fifth St., St. Paul, Minn.
Masonic Temple, Denver, Colo.Gould Building, Atlanta, Ga.
133 F St., N. W., Wash., D. C.
15 First St., San Francisco, Cal.All business outside the United States transacted by THE THOMSON-HOUSTON INTERNATIONAL CO.,
44 Broad Street, New York.**Highest Efficiency.****WESTON'S NEW****TRIPLEX
Chain Block**far exceeds all predecessors.
Send for Prof. Thurston's report
of comparative tests of all
chain pulley blocks.**The Yale & Towne Mfg. Co.**
STAMFORD, CONN.New York, 84-86 Chambers St.
Chicago, 152-154 Wabash Ave.
Philadelphia, 1120 Market St.
Boston, 224 Franklin St.Send for new
Catalogue
of
Specialties.**ALFRED BOX CO**
Front, Poplar and Canal Sts.
Philadelphia, Pa.Manufacturers of
Box's Pat. Double**Screw Hoists**
13,000 in use.Many have done hard
continuous duty 5 years
without a single part
being renewed. This is the
key of our success. They
have built up a reputation
themselves that cannot be
approached. Our improved**Radial Drills**are also assuming the same
standard.**SEBASTIAN LATHE CO.**

113-115 Culvert St., Cincinnati, O.

Manufacturers of Foot and Power

ENGINE AND SPEED LATHES,*Tools and Supplies. Catalogues Free.***LATHES.****ISRAEL H. JOHNSON, JR., & CO., - PHILADELPHIA.****Improved Cornering or Rounding Machine.**Designed for finishing shafts, poles, and all
kinds of bent stock where the diameter varies.
Extra jointing head and table furnished when
desired.The Largest Line in the
World of Wood Working Ma-
chinery. Any want taken care of.**J. A. FAY & EGAN CO.,**

179 to 199 W. Front Street,

CINCINNATI, OHIO, U. S. A.

350 medals awarded in the U. S.
and abroad. "Grand Prix,"
Paris, 1889.**Moore Mfg. & Fdry. Co.,**

Milwaukee, Wis., U. S. A.,

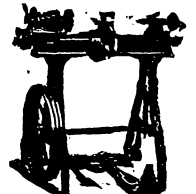
Manufacturers of

Moore's Anti-Friction**Differential****Chain Pulley****Block.**A New Movement!
A Perpetual Com-
pound Lever!
Powerful, Simple and
Durable!
One Man Can Lift to
the Full Capacity of the
Block.
Self-Sustaining at Any
Point.
The Block Always
Hangs Plumb.Send for descriptive price-list,
mentioning this paper.**Salem Foundry and Machine Shop**

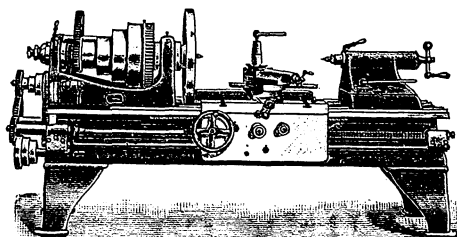
BUILDERS OF

ELEVATORS**SALEM, MASS.****Patent Foot Power Machinery****SCROLL SAWS, CIRCULAR SAWS,
MORTISERS, LATHES, &c.**For Carpenters, Builders, Cabinet Makers, and all Wood
and Metal Workers. Catalogue free.**SENECA FALLS MFG. CO.**

255 Water St., Seneca Falls, N. Y.

**HIGH
GRADE
ENGINE****LATHES,****BUILT FOR SERVICE.**

17 in., 20 in., 24 in. and 30 in.

The Muller Lathe is a
Tool that will meet the
requirements of all Ma-
chine Tool users.**THE BRADFORD MILL CO., - Cincinnati, Ohio.****BOOKS**YOU CAN OBTAIN PROMPTLY the latest
work on any subject in which you are interested
by addressing **DAVID WILLIAMS**, Publisher
and Bookseller, 96-102 Reade Street, New York.

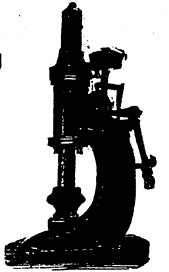


WM. SELLERS & CO.,

INCORPORATED,

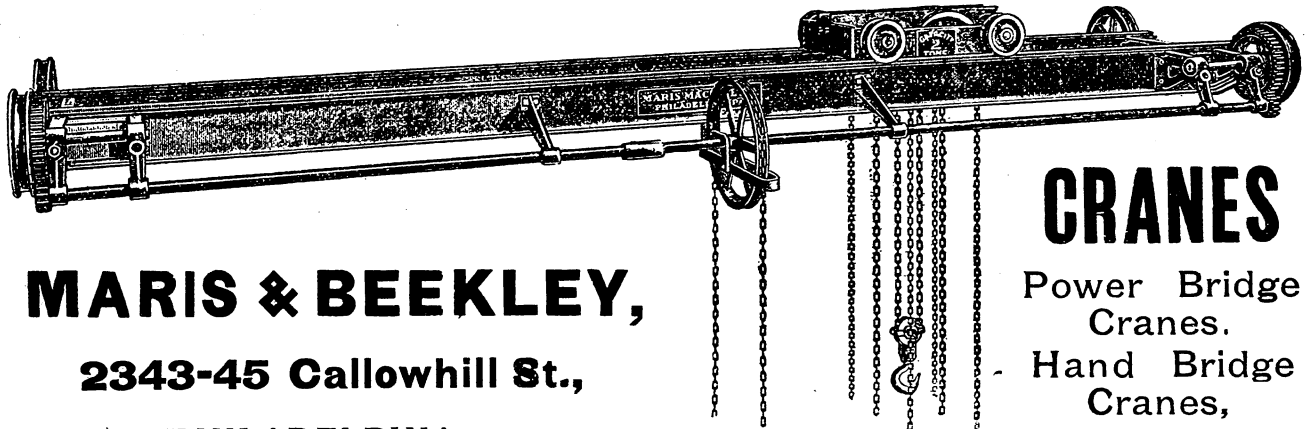
PHILADELPHIA, PA.,

—MANUFACTURERS OF—



Improved Machine Tools for Working Iron and Steel,
High Speed Power Traveling and Swing Cranes,
Injectors, Locomotive Turn Tables, Shafting, &c., &c.
Testing Machines, under patents of A. H. Emery.

Prices, Descriptive Matter, &c., Furnished on Application.



MARIS & BEEKLEY,

2343-45 Callowhill St.,

PHILADELPHIA.

CRANES

Power Bridge
Cranes.

Hand Bridge
Cranes,

Jib Cranes.

MORSE ELEVATOR WORKS.

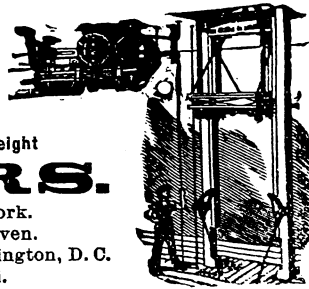
MORSE, WILLIAMS & CO.,

Manufacturers and Builders of

Electric, Hydraulic, Belt and Hand Power Passenger and Freight

ELEVATORS.

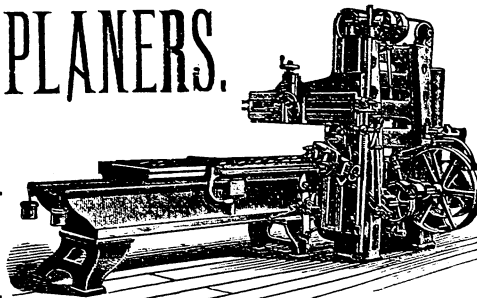
1105 Frankford Ave., Philadelphia, 108 Liberty St., New York.
33 Lincoln St., Boston, 82 Church St., New Haven.
425 Spruce St., Scranton, Pa., 118 E St., N. W., Washington, D. C.
1118 Chamber of Commerce Building, Chicago, Ill.



OPEN SIDE IRON PLANERS.

A FEW READY FOR
IMMEDIATE DELIVERY.

WRITE TO US DIRECTLY FOR
CATALOGUE AND PRICES.



THE DETRICK & HARVEY MACHINE CO., Baltimore, Md.

FAIRMOUNT MACHINE CO.,

(Successors to Thomas Wood & Co.)

Twenty-second and Wood Streets, Philadelphia, Pa.

Shafting, Gearing, Self-Oiling Bearings, Friction
Pulleys, Elevators.

Rope Transmission; Sheave Wheels, any size required, for Hemp, Manilla and Cotton
Rope Driving. Looms, Cotton and Woolen Machinery for Winding, Spooling,
Reeling, Beaming, Warping, Dyeing, Sizing, Scouring, &c.

THE NEWEST BOOKS on Scientific and Technical Sub-
jects promptly supplied, on receipt of price, by DAVID
WILLIAMS, Publisher and Bookseller, 96-102 Reade Street,
New York. Send for Catalogue.

J. G. SPEIDEL.

807 & 809 CHERRY STREET.
READING, PA.,
Patentee and Manufacturer of the
celebrated

Economic Safety Hoist.

500 to 30,000 Lbs. Capacity.
Has been awarded the John Scott
Medal and Premium by the Franklin
Institute of the City of Philadelphia
for Highest Efficiency, Simp-
licity and Durability.
One man can lift two to three times
as fast as with any other self-holding
chain hoist. It has two speeds, is
built strong and durable, and guaran-
teed to give satisfaction.

TRAVELING AND SWING CRANES up
to 30,000 lbs. capacity and 50 ft. span.
Overhead Framway, with Trolleys,
Switches, &c. Elevators and
Special Hoisting Machinery.
Illustrated Cat. and Prices on
application.



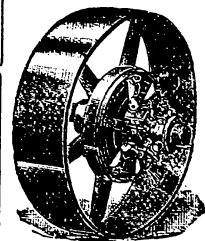
The Moore & White Co.,

Paper

Machinery,

Friction

Clutches, &c

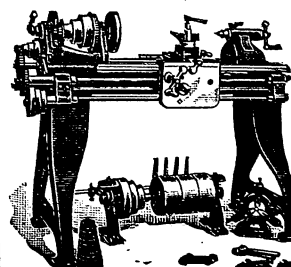


Clutch Pulley.

N. E. Cor. 15th AND LEHIGH AVE.,
PHILADELPHIA, PA.

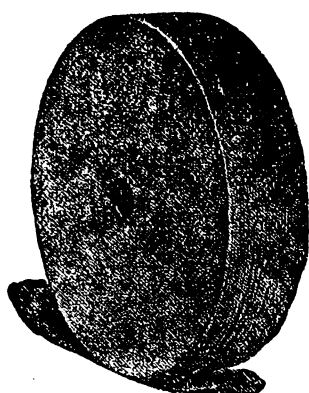
Latest Improved Screw Cutting Foot and Power.

LATHES



from 8 to 26
inch swing.
Catalogues
mailed upon
application.
Correspon-
dence solicited.

THE
SEBASTIAN
MAY CO.,
150-152 High
land Ave.,
Sidney, Ohio

Solid Leather Wheels**FOR POLISHING.**

Will outwear any other wheel
Saves the continual expense of
recovering. Pliable and elastic.
Waterproof and will not burst.

C. E. LE MASSENA & CO.,

776 Broad Street,

NEWARK, N. J.

"INDEPENDENT OF ALL COMBINATIONS."

THE**Huron Grindstone Co.,**

Port Austin, Mich.

MANUFACTURERS OF

Lake Huron Grindstones,
Mounted Grindstones,
Scythe Stones, &c.

WRITE FOR PRICES.

A POOR OIL STONE IS WORTHLESS.**PIKE'S**

Lilly White Washita is
Warranted to give
satisfaction.

THE PIKE MFG. CO., PIKE STATION. N. H**GEORGE E. BELL,**

Successor to E. M. HYDE and UNION STONE CO.,

—SOLE AGENT—

Waltham Emery Wheels,
WALPOLE MILLS TURKISH EMERY.

Dealer in Platers' and Polishers' Machinery and
Supplies of all kinds. Foundry Supplies.
36 JOHN ST., NEW YORK.

**WALTHAM EMERY WHEEL CO., Manufacturers****WALTHAM, MASS.**

By our various processes we can insure sat-
isfaction for the greatest variety of work.

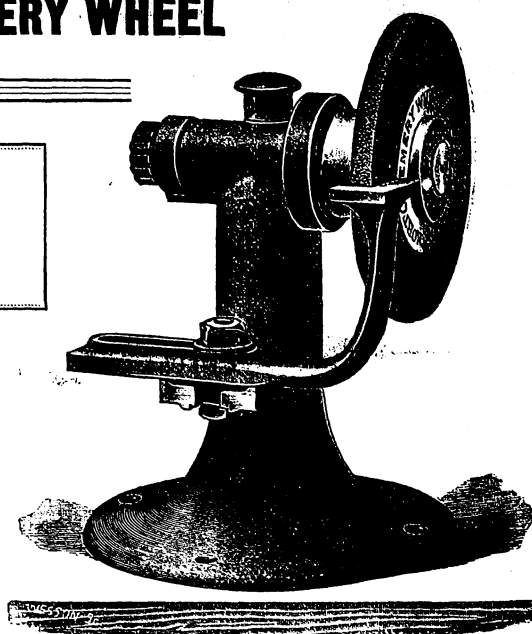
EMERY WHEEL MACHINERY,
EMERY, CORUNDUM, &c.

**FIRST-CLASS EMERY WHEEL
BENCH GRINDER**
FOR \$5

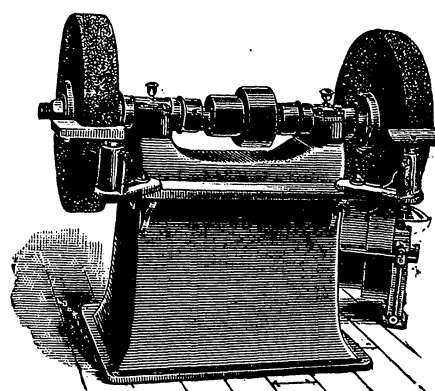
Will carry Wheels 10 in.
diam. x 1 in. thick.

Taper Spindle with easy
"Take Up."

Ample Oil Chamber....
Simple Rest, adjustable
in two directions.



Waste-oil carried away in centre of column.

NGRTON EMERY WHEEL CO., Worcester, Mass.**The Springfield Emery Wheel Co.,****Bridgeport, Conn.**

Western Agency, 125 So. Clinton St., Chicago, Ill.

EMERY AND CORUNDUM WHEELS,
To Run WET or DRY.

Over 50 Different Sizes of
Dry Grinders,

And over 200 different varieties of Emery
Wheel Machinery. All goods guaranteed
satisfactory.

SEND FOR CATALOGUE.

MICHIGAN EMERY WHEEL CO.,

194 Catherine St.,

Detroit, Mich.

SOLID EMERY AND CORUNDUM WHEELS,
TO RUN WET OR DRY. SPECIAL SHAPES.
PERFECTION SAW GUMMERS.

Send for Price-List.

FOR SALE BY THE FOLLOWING AGENTS:

The Robinson & Cary Co., St. Paul, Minn.
The Curtis & Co., Mfg. Co., Chicago, Ill.
The Western Iron & Supply Co., St. Louis, Mo.

The McIntosh-Huntington Co., Cleveland, Ohio.
The Hide Leather & Belting Co., Indianapolis, Ind.
The Machinists' Supply Co., Rochester, N. Y.

WE CAN SAVE YOU MONEY.
HAMDEN CORUNDUM WHEEL CO.,

Write for Quotations.

BRIGHTWOOD, MASS.**Naxos Emery.****FROM THE GRECIAN ARCHIPELAGO.**

We are the only concern in the United States import-
ing and manufacturing same. Quality guaranteed superior to
any other emery imported. For particulars and price-list address.

HAMPDEN EMERY AND CORUNDUM CO.,
CHESTER, - - - - - MASS.

BUFFALO BLACKSMITH DRILLS

BUFFALO FORGE CO.,

Philadelphia, Pa., 704 Arch St.

Buffalo, N. Y.

Chicago, Ill., Room 1306 Auditorium Tower.

BUFFALO PUNCH AND SHEAR.

IT'S **TO Your Advantage** to correspond with us regarding emery wheels.
Grant Corundum Wheel Mfg. Co.
 CHESTER, MASS.

Art Metal Works

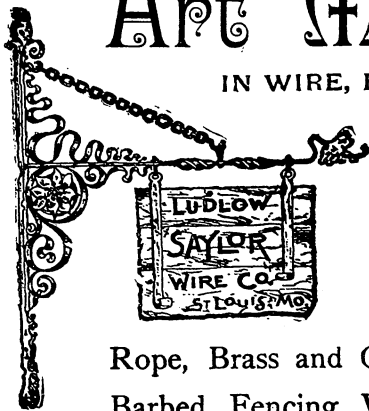
IN WIRE, BRASS and WROUGHT IRON.

**BANK AND OFFICE
RAILINGS**

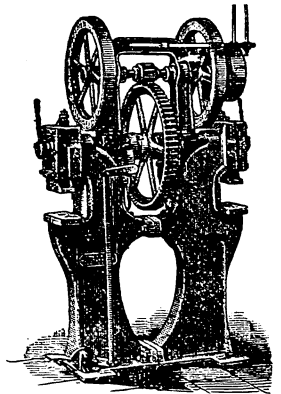
In Great Variety and of Handsome Designs.
ELEVATOR ENCLOSURES.

Iron and Wire Fences, Coal and
 Ore Screens, Wire Cloth and Wire

Rope, Brass and Copper Sheets and Tubing, Plain and
 Barbed Fencing Wire. Send for Catalogue and name this Paper.



THE LONG & ALLSTATTER CO.,
 HAMILTON, O.



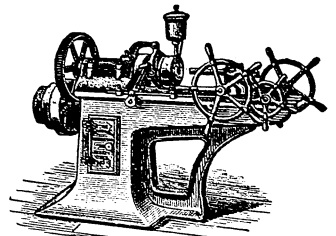
PUNCHES, SHEARS
 AND HAMMERS.

Double, Single, Horizontal, Twin-
 Boiler, Spacing Gate, Mul-
 tiple Angle Bar, &c.
 Belt and Steam
 Driven.

SEND FOR CATALOGUE.

THE NATIONAL MACHINERY CO.,
 TIFFIN, OHIO,
 —MANUFACTURERS OF—

BOLT AND NUT



MACHINERY

OF EVERY DESCRIPTION.

Upsetters and Benders,

Car Link and Pin Machinery.

CATALOGUE SENT ON APPLICATION.



IMPROVEMENTS PATENTED 1890 IN THE U. S., CANADA AND EUROPE.

FIRE-PROOF. Easily applied by anyone. Send for Samples and Descriptive Price List.

H. W. JOHNS MANUFACTURING COMPANY,

H. W. Johns' Asbestos Fire and Water-Proof Sheathing, Building Felt, Steam Packings,
 Boiler Coverings, Liquid Paints, Roof Paints, Roof Cement, Fire-Proof Paints, etc.

87 MAIDEN LANE, NEW YORK,

JERSEY CITY, CHICAGO, PHILADELPHIA, BOSTON, ATLANTA, LONDON.

**FOR NUMBERING AND LABELING
Boxes, Drawers and Shelves,**
 In Hardware Stores and Factories.

Send for sample and description of our Handy
 Box of small gummed Letters and Figures, intended
 for labeling shelf boxes. Put up especially for the
 Hardware trade.

THE TABLET AND TICKET CO., Mfrs.,
 67-69 Franklin St. Chicago. 99 Franklin St., New York.

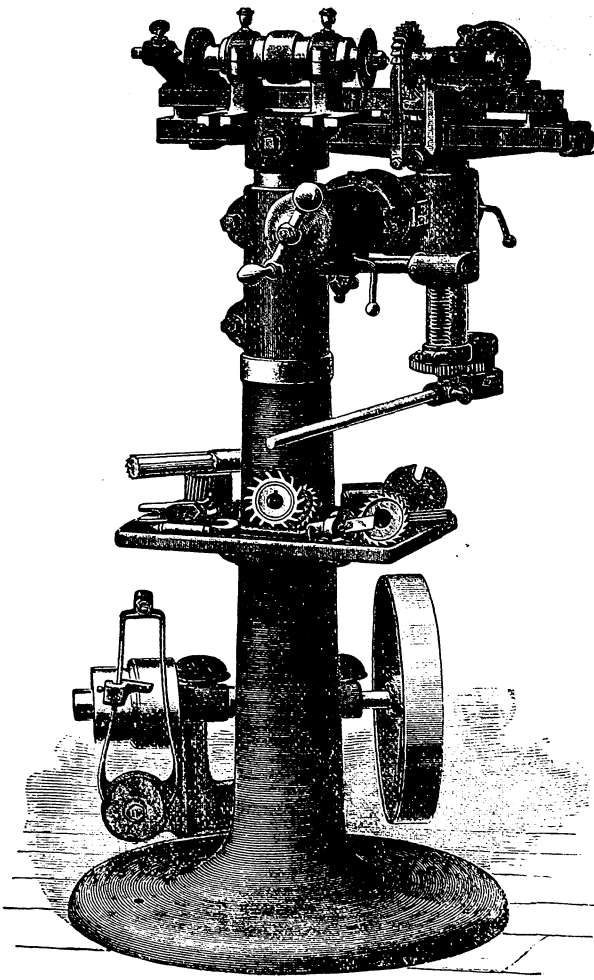
**WILLSON'S
PAPER
LETTERS**

**ENGINEERS, CONTRACTORS, MANUFACTURERS OF
SPECIALTIES,**

Mechanical, Electrical, Hydraulics, Pneumatics;
 Facilities for the manufacture of articles from
 one ounce to twenty tons weight. Dynamos,
 Motors, Typewriters, Check Punches, Printing
 Telegraph Instruments; in fact, anything re-
 quiring close work and good facilities. Esti-
 mates given. Correspondence solicited.

BRADY MFG. CO.,

83 Washington St., Brooklyn, N. Y.



Universal Cutter and Reamer Grinder.

A Little Spent

IN KEEPING TOOLS SHARP

= Pays Big. =

THERE IS A MACHINE, not high-priced, easy to operate, that WILL keep your Milling Cutters, Gear Cutters, Pin Drills, Reamers and Planer Tools in THE BEST POSSIBLE CUTTING CONDITION.

Cylindrical and Surface Grinding are some of its features.

Shall we send you illustrated pamphlet showing application of the machine to your work?

THE CINCINNATI MILLING MACHINE CO.,

BUILDERS OF FINE MACHINE TOOLS,

Cincinnati, O.. U. S. A.

WE ARE

General Eastern Agents

FOR

G. A. Gray Co.'s Planers,
The Celebrated Muller Lathes,
W. F. & Jno. Barnes Co.'s Drills and Lathes
Kelly Adjustable Crank Shapers,
Smith & Silk Crank and Geared Shapers,
Dietz, Gang & Co.'s Radial Drills,

And LOCAL SELLING AGENTS for

P. Blaisdell & Co.'s Lathes and Drills,
Hendey Machine Co.'s Lathes and Shapers,
Geo. H. Eaton & Co.'s Power Presses and
Shears,
Slate Machine Co.'s Sensitive Drills,
Diamond Machine Co.'s Grinding and Polish
ing Machinery.

A LARGE STOCK ALWAYS ON HAND.

The Garvin Machine Co.,

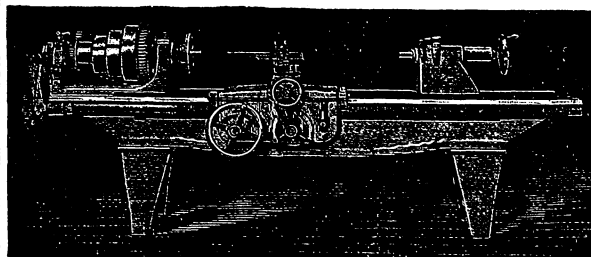
Laight and Canal Sts., New York.

Wanted, Contracts

For building mining, blast furnace, rolling mill and factory machinery, for making castings for cable and electric railroads, or any special line of castings. Address

MAHONING FOUNDRY AND MACHINE SHOP

Danville, Pennsylvania.



TURRET
MACHINES,
LATHES,
MILLING
MACHINES,
SPECIAL
MACHINERY

JOHN L. BOCERT, FLUSHING, N. Y.

IT'S DIFFERENT

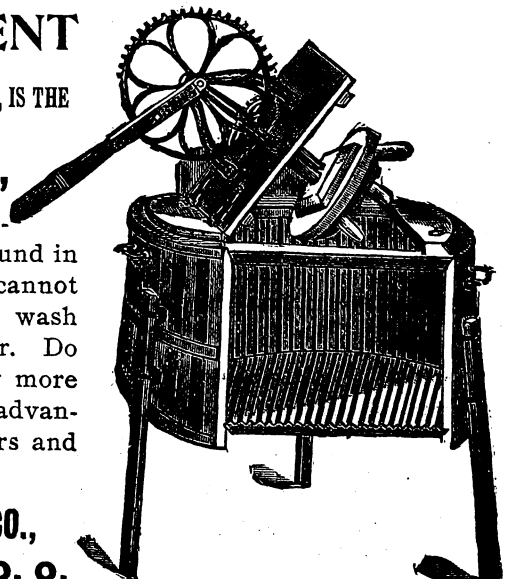
FROM ANY OTHER IN MANY RESPECTS, IS THE

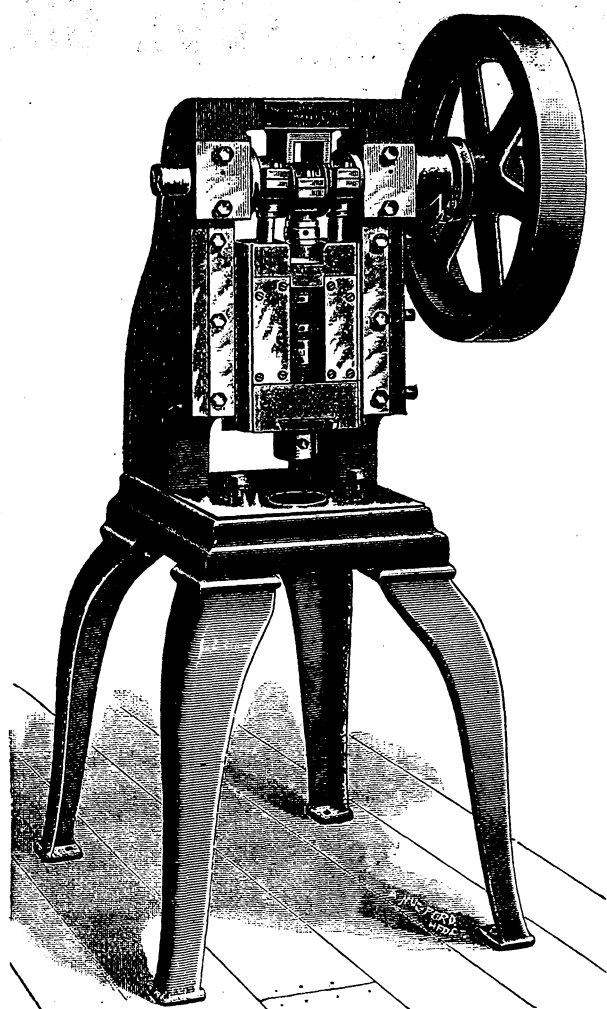
AMERICAN WASHER,

and free from all the objectionable features usually found in machines of this class. It cannot tear the clothes, nor can it wash unclean or tire the operator. Do you see the point? To know more about it is to your and our advantage. Write us for particulars and prices.

UNION MANUFACTURING CO.,

WM. PETER, Owner, TOLEDO, O.





AT ONCE

We have in stock a number of *Power Presses* of our own manufacture and fully guaranteed, which can be **DELIVERED IMMEDIATELY.**

PARTICULARS ON APPLICATION.

The E. J. Manville Machine Co.,
WATERBURY, CONN.

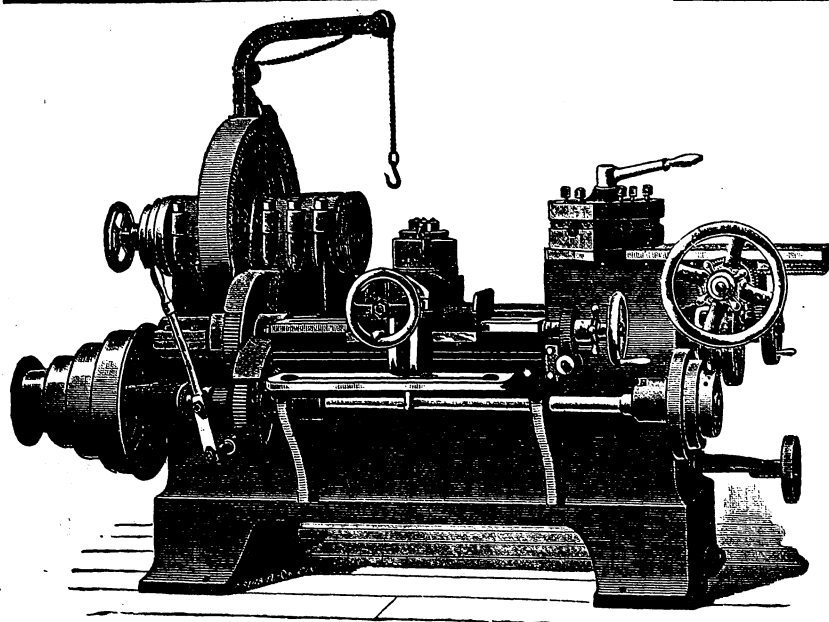
SPECIAL
AUTOMATIC
MACHINES.
—
POWER PRESSES.
—
WIRE-WORKING
MACHINES.

ENGINE LATHES.

13 Inches, 15 Inches, 22 Inches.

Pulley Lathes,
Pulley Drilling,
Tapping Machines,

Engine Detail Machines,
Special Turret Lathes,
Cylinder Boring Machines.



THE
Lodge & Shipley
Machine Tool
Co.,

107-113 Culvert St., - CINCINNATI, O.

Write for Prices on
DRILLS,
TURRET LATHES,
GEAR CUTTERS,
HORIZONTAL BORING
MACHINES.

THE LODGE & DAVIS MACHINE TOOL CO.,

WORKS, CINCINNATI, O., U. S. A.

WE MANUFACTURE

COMPLETE MACHINE SHOP OUTFITS.

Pulley Lathes,

30, 42, 60 in. Swing.

Heavy Turret Lathes,
Brass Finishing Lathes.

Planers, Shapers,

Upright Drills,

Radial Drills,

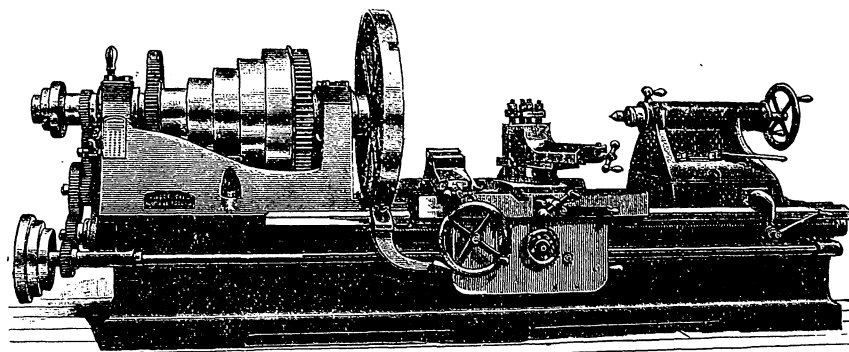
Sensitive Drills,

Milling Machines,

Screw Machines,

Punches and Shears,

Bolt Cutters, &c.,



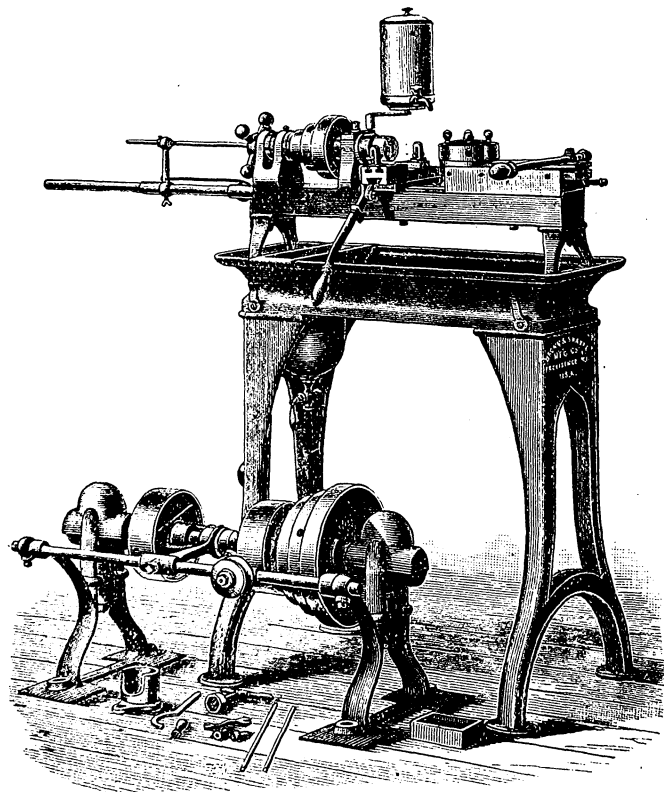
14 to 40 inch Standard Engine Lathes.

NEW YORK, CHICAGO, BOSTON, ST. LOUIS.

BROWN & SHARPE MFG. CO.

PROVIDENCE, R. I.

NO. 1 SCREW MACHINE.



AUTOMATIC CHUCK AND WIRE FEED.

For making the small screws required by Sewing Machine Manufacturers, Gunsmiths and Clock Makers, and for manufacturing small tools, Jewelers' swivels, buttons, etc.

The machines and tools described in catalogue are usually kept in stock.

10 Park Place, New York.

CORLISS,

Wright, Porter-Allen, Buckeye and Slide Valve Engines, Boilers, Pumps, &c.

- 2 30 x 72 Corliss Engines. 1 11 x 80 Buckeye Engine.
 1 30 x 60 Corliss Engine. 1 14 x 28 Buckeye Engine.
 1 26 x 60 Corliss Engine. 1 22 x 48 Buckeye Engine.
 1 26 x 48 Corliss Engine. 1 14 x 80 Porter-Allen Eng.
 1 23 x 36 Corliss Engine. 1 11 x 16 Porter-Allen Eng.
 1 16 x 36 Corliss Engine. 1 9 1/2 x 12 Armington & Sims Engine.
 1 14 x 42 Corliss Engine. 1 8 x 10 Valley Mch. Co. Engine.
 1 14 x 36 Corliss Engine. 1 12 x 24 Corliss Engine.
 1 pair 26 x 60 Corliss Eng. 2 11 x 20 Cummmer Engines.
 1 8 ft. & 1 9 ft. Fan Blower. 1 60 H.-P. Westinghouse Engine.
 1 10 x 6 x 12 Blake Pump. 1 25 H. P. Westinghouse Engine.
 1 Blake Pump, 6 x 4 x 7. 1 28 x 48 Slide Valve Eng.
 1 Blake Pump, No. 000. 1 18 x 36 Slide Valve Eng.
 1 12 x 7 x 12 Niagara Pump. 1 17 x 42 Slide Valve Eng.
 1 8 x 18 Cameron Pump. 1 16 x 36 Slide Valve Eng.
 2 Centrifugal Pumps. 1 14 x 18 Slide Valve Eng.
 1 No. 2 Guild & Garrison Pump. 1 13 x 24 Slide Valve Eng.
 1 Deepwell Pump, 7 x 10 cyl. 1 11 x 20 Slide Valve Eng.
 1 80 in. Corn Mill and Emery Grinder. 2 20 x 48 Wright Engines.
 1 Corliss Condenser, 600. 100 ft. of 7-in. Wrought-Iron Pipe.
 2 Bulkley Condensers, 500. 1 Bogardus Mill.
 1 Blake Crusher, 10 x 7. 1 Sawdust Feeder.
 1 6 1/2 ft. x 14 ft. Tubular Boiler. 1 Boiler Iron Tanks.
 1 80 H.-P. Marine Boiler. 1 Logging Locomotive.
 1 Brennan Crusher, 8 x 25. 1 8 x 8 Vertical Engine.
 2 Platform Scales. 1 Duplex Fire Pump.

G. M. CLAPP, 74 Cortlandt St., New York.

FOR SALE.

BAKER BLOWERS. Nos. 1, 3, 4, 4 1/2, 5, 6 and 7.
ROOT BLOWERS. Nos. 1, 2, 3, 4, 5, 6 and 7.
 Sturtevant Blowers, Nos. 6, 7 and 8.
 2 12 and 1 15 H.-P. Horizontal Boilers; new, very cheap. 10 in. x 7 in. Blake Crusher; equal new. Corliss Engine, band wheel in halves, 12 ft. x 24 in. x 9 in. hole. 1 large Bunker & Boschert Press. 1 Niagara Fly Wheel Pump, 14 in. x 7 in. x 10 in., brass lined.
 Purchasers of machinery and those who have it for sale will do well to correspond with C. R. BIGELOW, Machinery Expert and Appraiser, 45 Dey St., New York City.

OLD ROLLS AND HEAVY CASTINGS.

About 100 tons for sale. Party desiring them please state delivery point.

G. W. SCHULTZ & CO.,
308 Walnut St., PHILADELPHIA.

- 1 30 in. x 80 in. x 8 ft. Pease Planer. New.
 1 Putnam Car Axle Lathe. New.
 1 Cold Sawing Machine for iron and steel. New.
 1 Jones & Lamson No. 3 Plain Screw Machine. Second hand.
 1 Parham Plain Screw Machine. Second hand.
 1 Jones & Lamson 23-in. swing Turret Chucking Lathe.
 1 Brown & Sharpe No. 2 Screw Machine, wire feed.
 The above Tools can be had at very low prices.

DANIEL KELLY,

51 N. 7th St., Philadelphia.

Corliss Engine, 14 x 36; first-class condition.
 Plain Engine, 12 x 30; good order.
 Belt Wheel, 8 ft. diam., 20 in. face, 7 in. bore.
 Belt Wheel, 10 ft. diam., 13 in. face, 6 1/2 in. bore; split.
 Belt Wheel, 11 ft. diam., 18 in. face, 13 in. bore; split.
 2 Sturtevant Fans, 8 ft. high.
 Clutch Pulley, 60 in. diam., 23 in. face, 5 7-16.
 Large assortment New and Second-hand Machinery Shafting, Pulleys, Belting, Tools, Iron, &c.

H. B. BIRTWELL,

343 North 3d St., Philadelphia.

Great Bargain.

A full set of Automatic Cut-off Engine Patterns, with drawings, wood cuts and patent right to manufacture; are almost new, and were made by the finest workmen. If sold at once will let them go at a sacrifice. Address "ENGINE," No. 112, office of *The Iron Age*, 96-102 Reade street, New York.

FOR SALE.

- 2 5 H.-P. Gas Engines.
 1 "O" Knowles Pump.
 1 7 x 20 Lathe.
 1 Boiler Upright, 24 x 72.
 10 New Road Scrapers.
 1 Pair Cornish Rolls, good as new.
 2 Lewis Bolt Headers.
 1 Alligator Shear.

H. H. MANSFIELD, 126 Liberty St., New York.

FOR SALE.

One Stationary Double Cylinder Steam Crane, capacity 5 tons.
 One Bookwalter Steel Converter, complete.
CHICAGO HORSE SHOE CO., F. Chicago, Ind.

A Condenser Beam Engine,

cylinder 36 in. by 7 ft., air pump, condenser, &c., complete; can be seen at Front and Pearl Sts., Brooklyn, N. Y.

BROOKLYN BRASS & COPPER CO.**FOR SALE.**

Large lot of Loco. Boilers,
50 to 100 H.-P., in first-class order.

Can furnish stacks, grates and all fittings to suit purchasers.

CHESTER BERTOLETTE & CO.,

Norristown, Pa.

FOR SALE. PUMPS, ENGINE & BLOWER.

- 1 Cameron Pump, No. 12 Special.
 2 Guild & Garrison Pumps, No. 3.
 2 Small Pumps.
 1 8 in. x 12 in. Vertical Engine.
 1 Dimpfel's Blower, 5 ft. x 20 in.

DAN'L W. RICHARDS & Co.,

86-92 Mangin St., New York.

FOR SALE.

2 Double Deck Boilers about 40 H.-P. each, good and cheap. 2 Iron Tanks, 8 ft. in diameter, 30 ft. long, 3-8 iron, 11,000 gallons capacity. Cylinder Boilers for Stacks, 40 and 42 in. diameter. Other Stacks from 10 in. up to 20 and 30 ft. long. Hoisting Engine. Round and Square Iron Tanks, different sizes. Dealers in all kinds of Scrap Iron. New and Old Metals and Machinery.
BUSSENIUS & CUNLIFFE,
 12th and Washington Ave., Philadelphia.

FOR SALE.

CRANK and GEARED SHAPERS.

Write us for Bargains.

J. STEPTOE & CO., Cincinnati, O.**FOR SALE.**

25 lb. section iron T Rails in good condition for relaying.

WM. H. PERRY & CO.,

Providence, R. I.

Squeezer For Sale.

Extra strong, with engine attached 17 x 24 in. Weight of Squeezer alone 96,000 lbs. In use two years. For further particulars address

P. O. BOX 205,

Pittsburgh, Pa.

For Sale Cheap.

3 Boiler Makers' hand rollers, 4 in. diameter by 50 inches long between housing; large enough to take in a 48 in. plate and roll 1/8 to 3-16 thick. Apply to

REUTER & MALLORY,

22 Light St., Baltimore, Md.

FOR SALE

The Vulcan Iron Works, located at Oswego, New York, has a large and prosperous business in the manufacture of dredges steam shovels, marine pumps, &c., &c.; also have a large jobbing business. This is an old and thoroughly established concern, and will be a very profitable investment for the right man. Terms of suit purchaser. The only reason for selling is that the owner is advancing in years, and his health being poor, desires to retire from active business. Address B. F. CHASE, Chicago, Ill., or R. H. KING, Oswego, N. Y.

WANTED.

One new or good second-hand Air Compressor to work against 60 lbs. air pressure. The compressor is to be run by belt and have about a 15-inch diameter air cylinder. Send full descriptions and prices to

"AIR COMPRESSOR,"office of *The Iron Age*, 96-102 Reade St., N. Y.

D

MACHINERY, NEW AND SECOND-HAND, FOR SALE.**LATHES.**

- 60 in. x 18 1/2 ft., Geared Face Plate.
 60 in. x 45 ft., " " " " Double Lathe, complete.
 52 in. x 35 ft., Rod Feed only; one end has Hor. Boring Machine.
 48 in. x 27 ft., cheap.
 36 in. x 18 ft., Geared Face Plate.
 36 in. x 16 ft.
 33 in. x 27 ft.
 30 in. x 28 ft., Shafting Lathe, Pond.
 28 in. x 22 ft., cheap.
 24 in. x 10 ft.
 10 in. x 4 ft., A1.

- 22 in. x 16 ft.
 25 in. x 12, 16, 20 and 24 ft.
 22 in. x 10 ft.
 21 in. x 8, 10 and 12 ft.
 20 in. x 5, 6 and 10 ft.
 18 in. x 4, 7 and 8 ft.
 17 in. x 6 and 7 ft.
 15 in. x 6 ft.
 14 in. x 6 ft.

PLANERS, SHAPERS, SLOTTERS.

- 3 ft. x 15 in.
 4 ft. x 20 in.
 5 ft. x 22 in.
 5 ft. x 24 in.
 6 ft. x 24 in.
 5 ft. x 25 in.
 5 ft. x 24 in.
 7 ft. x 25 in.
 7 ft. x 30 in.
 8 ft. x 31 in.
 12 ft. x 36 in.
 14 ft. x 42 in.
 22 ft. x 64 in.
 24 ft. x 64 in.

Lincoln Millers Gang Drills, Screw Machines, Steam Hammers, 100, 150, 1000 and 3000 lbs.
 Drill Presses, 20, 24, 26, 28, 30, 44 in. Upright.
 Bolt Cutters, 1 1/2, 1 3/4 in.
 Flanging Machine, O'Brien Pat., for Circular Boiler Heads.
 Gear Molding Machine, Scott's Pat., 3 different sizes.
 Bliss Punching Press, No. 75.
 Corliss Engines, 12 in. x 24 in., 14 in. x 36 in., and 16 in. x 42 in.
 Brown Engine, 16 in. x 48 in. Whitehill, 11 in. x 18 in.
 Vertical Engine, 13 in. x 16 in., N. Y. Safety Steam Power Co.
 Send for latest list.

GEO. PLACE MACHINE CO.,

120 Broadway, New York.

For Sale Cheap.

About 6000 feet of Steel Well Tubing, 9 inch outside diameter, 3-16 inch wall. Practically new. In lengths of about 17 ft. Can be sold with plain ends or threaded and complete with couplings. Will make magnificent oil, water, gas or sewer service, or can be used for well tubing or exhaust steam.

One old 2-flue Boiler, 10 feet long, 3 feet diameter, 9 1/2-inch shell. To be sold as scrap.

About a carload of old center and side bearing street rail, long and short, straight and bent; some Johnson slot rail, switches, curves and special work; some bent girder rail and miscellaneous wrought. All to be sold as scrap. 25 two platform, 2 horse closed Street Cars, Stephenson type, with Stephenson gears. In A1 order, but need repainting.

J. B. KENDALL,

Washington, D. C.

For Sale or Rent.

Rolling Mill and Nail Factory of the Lewisburg Iron and Steel Co. Mill supplied with water, slate roof buildings, 2 engines, 4 large tubular boilers, 7 puddling furnaces, 1 large heating furnace with boiler over same, 42 nail machines, 2 trains of rolls, and other machinery. Connection with Pennsylvania R.R. and Philadelphia & Reading R.R. by switches on both sides of mill. Works now in operation. Address **ALFRED HAYES, Secretary,** Lewisburg, Union Co., Pa.

FOR SALE.

One 16 x 24 in. Standard Gauge Locomotive.
 One 15 x 20 in. Standard Gauge Locomotive.
 One 7 x 12 in., 36-in. Gauge Locomotive.
 Fire Box Boilers from 15 to 100 horse-power in stock; Engines, Boilers, Shears.
 Hoisting Engines, Derricks and Contractors' Machinery.

THOMAS CARLIN'S SONS,
Allegheny, Pa.

4 BOILERS.

Four second-hand 75 H.-P. Double-Deck Boilers, with all fittings and fixtures. In first-class condition. Cheap.
 Two 2-flue Boilers, 48 in. diam. x 32 ft. long, in prime condition. Cheap.
 One 16 x 22 Side Crank Engine.
 One 16 x 36 Side Crank Engine.
 Full line of new and second-hand Boilers and Engines always on hand.

H. M. Sciple & Co., 3d and Arch Sts., Philadelphia, Pa.**For Sale, Cheap.**

200 tons of 60-pound Second-hand Steel Rails.

Suitable for relaying. F.o.b. cars Buffalo, N. Y. For prices, &c., address

J. H. RICHARDSON & CO.,

Pittsburgh, Pa.

WHERE TO LOCATE NEW FACTORIES.

The Illinois Central Railroad Company is desirous of calling the attention of capitalists and manufacturers to the advantages possessed by the different cities and towns on their Southern Lines and on the lines of the Yazoo & Mississippi Valley Railroad Company in the shape of

UNLIMITED RAW MATERIAL, PROXIMITY TO MARKETS, CHEAP LABOR,

Fuel, etc., and believes that it needs but a presentation of their merits to attract the careful attention of all interested in converting the raw materials to be found on their lines into the finished product. Prominent among these are cotton, hard and soft wood, clay, fruits, vegetables, etc. A descriptive pamphlet of 150 pages, entitled "Where to Locate New Factories," has been issued by the Company, and a copy will be sent free on application to the undersigned, who will also give any further information as to

Inducements Offered

by the different localities for desired industries. Individuals or companies wishing to embark capital in cotton, clay, wood-working, canning or other industries, can find a profitable field and hearty co-operation. For particulars address GEO. C. POWER, Industrial Commissioner I. C. R. R., 58 Michigan Ave., Chicago.

FOR SALE OR RENT.

Manufacturing Property.

Having purchased the Auburn Manufacturing Company's plant, with greater facilities for manufacturing carriage forgings, which my increasing trade demands, I offer my former plant for sale or rent, which consists of two-story stone and wood building, 60 x 30, and three-story stone and brick building, 75 x 40. Also forge shop, 22-ft. posts, 150 x 54, with large double windows between each bent. 50 x 30 boiler house. Splendid water power, 11 ft. head. One 64-in. American Turbine. One 24-in. Little Giant Turbine. 200 ft. 2 1/4 Cold Rolled Iron Shafting. 40 ft. 2 1/4 Cold Rolled Iron Shafting. 60 ft. 2-in. Cold Rolled Iron Shafting. Furnished with self-oiling boxes. Water wheel governor; 4-ton Buffalo Scales. The premises cover about 2 1/2 acres. Shipping facilities of the best. Located near N. Y. Central and Philadelphia and Reading depots. Will be sold cheap and on easy terms or rented. For particulars address

RICHARD ECCLES, Auburn, N. Y.

WANTED.

Responsible parties to manufacture and sell on royalty, a cheap portable steel or iron **CUL-VEET BRIDGE**; it is adapted to all small streams, runs, etc., in roads, streets, **RAILROADS**, etc.; improved roads is the order of the day; use this bridge, put it below the level of the road, cover it over and thus prevent jarring and wear and tear of vehicles, etc. Apply to

W. A. NICHOLS,
Girard Building, Philadelphia, Pa.

STEAM PUMPS.

All inquiries for second hand pumps, of which we always have several on hand, of our own and other makes, will have prompt attention. For catalogues of the Hooker Patent Steam Pumps and full information in regard to steam pumps address

HOOKE-COLVILLE STEAM PUMP CO.,
30 W. Randolph St., 2d and Carr Sts.
CHICAGO. ST. LOUIS.

NOTICE.

Wanted, party with \$15,000 to \$25,000 to take active interest in business, manufacturing goods covered by patents and which are being generally used by manufacturing concerns. Experimenting completed and goods ready to put on the market. Capital wanted to extend business, which will bear close investigation. Address

"MANUFACTURING INTEREST,"

office of *The Iron Age*, 509-510 Hamilton Building, Pittsburgh, Pa.

WANTED.—A moderate capital to be used in the purchase and operation of an Architectural Iron Business, with a modern and complete plant conveniently located for both foreign and domestic markets. Apply by letter addressed to

"Z," No. 38,
Office of *The Iron Age*, 96-102 Reade St., N. Y.

FOR SALE. Air Compressor.

One Clayton Double Cylinder Air Compressor, with self actuating valves, together with one Double Cylinder Oil Pump and Receiver.

Air Compressor,

Steam cylinder 7 in. diam., 9 in. stroke.
Air " " 9 in. " 9 in. "

Oil Pump.

Steam Cylinder 3 in. diam., 5 in. stroke.
Oil " " 1 1/2 in. " 5 in. "

Oil chamber 24 x 30 in.

Receiver 24 x 80 in.

Address

FAYETTE R. PLUMB,
Frankford, Philadelphia, Pa.

FOR SALE.

One Horizontal 34 in. x 60 in. Corliss Engine. Shafts 16 in. diameter at bearings, 17 3/4 in. diameter at center, 14 ft. long; extra heavy fly wheel, 25 ft. diameter, made in 12 segments; pulley, 9 ft. diameter, 18 in. face. Cut gear on shaft to run a jack shaft for 20-in. mill; crab clutch on end of engine shaft for 22-in. rail train; 600 to 800 H.-P. Address

NEW ENGLAND STEEL WORKS,
Worcester, Mass.

FOR SALE.

An old established prosperous business in a large city of New York State, fitted complete for and engaged in the manufacture of hardware specialties. Or with right party or parties who thoroughly understand this business will form an incorporated company, leaving in all of the present plant as stock. Present proprietor sells because other matters more important to him are imperatively demanding all of his time. Address "PROSPEROUS BUSINESS," office of *The Iron Age*, 96-102 Reade St., N. Y.

WANTED,

At Colorado City, Texas, a Roller Mill to be put up at once. Big inducements offered. Address
H. H. BEYER,
Colorado, Texas.

Hardware Stock.

For sale in the city of Rochester, stock of general Hardware, House-furnishing Goods, Paints, Oil, Glass, &c. First-class location; doing a good business; amount of stock about \$6000; will bear a close investigation. Address

"HARDWARE," Box 114,
Rochester, N. Y.

FOR SALE.

A nice, clean stock of Builders' Hardware and Carpenters' Tools. Best location and trade in the city. Address

W. J. FLYNN HARDWARE CO.,
St. Joseph, Mo.

FOR SALE.

Hardware business in a city of 40,000. Best location. Stock will invoice about \$10,000. Annual sales, \$30,000, which can be increased readily. Present owner is engaged in other business and can give this no personal attention. Favorable terms. Address

J. C. PETERS,
Fort Wayne, Ind.

WANTED.

Foundry Contracts to be completed before September 1st. Capacity of works, 9 tons per day. Can make close prices and prompt shipment.

FRANK C. PATTEN CO.,
Sycamore, Ill.

FOR SALE.

Stock of Hardware, Stoves and House-furnishing Goods at West Superior, Wisconsin. Business has been established seven years. Sales average \$80,000 yearly. Stock and fixtures will inventory \$15,000; can be reduced to suit purchaser. This is a splendid opportunity to engage in an established business, in the most promising town in the Northwest. Apply

CHAPIN-WELLS HARDWARE CO.,
Duluth, Minn.

RECEIVER'S SALE. Stock of Hardware,

At Atlanta, Ga.

I will receive bids until April 14th for the stock of Logan & Graham Hardware Co., at Atlanta, Ga. Business running right along; established trade; well assorted stock of about \$7500; good stand. Lease on store can be continued if desired and two well posted men retained. Atlanta is the best city in the South. Excellent opportunity to get an established business cheap. For terms and further particulars address

JAMES L. LOGAN, Receiver,
86 Decatur St., Atlanta, Ga.

A RARE CHANCE.

I offer for sale the entire plant of a small manufacturing concern making patented hardware specialties, such as wrenches, saw sets, screw-drivers, &c.

This offer includes **Machinery and Tools**, all in good order and in daily use; **Stock of Goods**, both finished and unfinished; **Patents**, twenty in number; **Contracts**, and **Goodwill** of business.

This is a **good opportunity** for any firm or corporation to **increase their business** by adding a line of **desirable goods** already **introduced** and known to the trade, and for which there is a steadily **increasing sale**, many of them being **illustrated** in the leading hardware **catalogues** of the country. The **plant** is offered for sale because the **manager and financial man** is **unable** to attend to the **business** because of **sickness**. None but principals and parties meaning business need apply, as the matter must be closed at an early day. Address

"T. T.," Box 224,
New Haven, Conn.

Hardware Stock For Sale.

A \$4000 stock in a fine manufacturing town with a population of about 5000. Annual sales \$35,000. Tin shop in connection, with large factory trade and telephone connections with all factories and Chicago. This is one opportunity in a lifetime. Terms cash. If you want a bargain address "M.," office of *The Iron Age*, 59 Dearborn St., Chicago, Ill.

Agencies Wanted.

Having a large and centrally located store, convenient to the hardware trade of New York City, would like to secure agencies for heavy hardware, pipe, iron, &c., on salary or commission. Address

CHAS. J. STEBBINS,
103 Reade St., New York.

EUGENE BISSELL, Auctioneer. HAYDOCK & BISSELL

Successors to
ROBERT R. HAYDOCK & Co. and E. BISSELL & Co.
WHOLESALE

HARDWARE AUCTIONEERS,
12 Murray St. and 15 Park Place, N. Y.
Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

Any Manufacturer

of Hardware or Machinists' Specialties desiring to be represented in New York City and vicinity, will find it to his interest to address

E. J. HUSSEY & CO.,
80 John St., New York.

We are centrally located, active workers and can furnish best of references.

Collections?

All merchants and manufacturers have past due claims which need attention. We make such business a specialty. Our terms and method are right. Write us and see.

THE HARDWARE BOARD OF TRADE, Ltd.,
4 and 6 Warren street, New York.
JAS. H. GOLDEY, Treas.

FOR SALE.

Our stock of Hardware, Stoves and Tinware at a decided bargain, in the growing city of Ogden. Good reasons for selling. If you are interested it will pay to investigate this. Address

HORNBY & CARMAN,
Ogden, Utah.

Bessemer Iron Ore Mine.

In New York State, near railroad, for sale. Analysis by Andrew S. McCreath, Harrisburg, Pa.:

Titanic acid.....none.
Metallic Iron.....66.600.
Phosphorus.....0.006.

Address
"ORE MINE,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

WANTED.

To rent, a modern equipped Machine Shop and Foundry capable of doing heavy work; to be located in Philadelphia or suburbs. Address
"HEAVY WORK,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

WANTED.

To communicate with a party who has modern conveniences to manufacture heavy machinery; location, Philadelphia or suburbs. Address
"MODERN CONVENIENCES,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

WANTED.—Two second-hand Sheet Mill Housings, with boxes and screws; also sufficient bed plate for the same. Light housings will answer. Send sketch and dimensions, with lowest price. Also one second-hand jib Crane, operated by steam, of about 10 or 12 tons capacity. Send drawing, showing dimensions, with lowest price. Address "STEEL," No. 46, office of *The Iron Age*, 96-102 Reade St., N. Y.

FOR SALE.—A stock of Hardware, Sash and Doors; will invoice about \$5000. Situated in a growing town in Southern Indiana of 1000 inhabitants. Only stock in place. Address
"SASH AND DOORS,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

AGENCY WANTED.

Exclusive Agency for some small and simple Tool or specialty applicable to mining, quarrying or steam engineering. Address

"SPECIALTY,"
office of *The Iron Age*, 96-102 Reade St., N. Y.

CHARLES WEILAND.

I make a special business of buying and selling; Job Lots of

HARDWARE AND CUTLERY

Tools and Second Quality Files a Specialty.
Send for Catalogue,

143 Chambers St., New York.

FOR SALE.

Punching and Shearing Machinery.

Hand and Belt Power.

Boiler Makers' Rolls.

NEW DOTY MFG. CO.,

Janesville, Wisconsin.

YOU Can Tin Cast Iron as readily and cheap as Malleable Iron.

The Flanders process for tinning cast iron is now an assured success and is in use by some of the largest firms in the country. Correspondence solicited for the erection of galvanizing or tinning plants. Mr W. T. Flanders will continue to superintend the building and starting of all plants. Address

THOS. SANDS,

Nashua, N. H.

LUXURY ON WHEELS. THE LATEST BOOKS.

The "Electric" trains of the Cincinnati, Hamilton & Dayton R. R. and "Monon" Route between Cincinnati and Chicago are provided with the latest product of the Pullman Co. built expressly for this service. There are 10 compartments in each car, which may be converted at will into complete drawing rooms, most beautifully and harmoniously decorated, lighted by the Pintsch gas system, and are positively the most modernly equipped sleeping cars in the world. This is the only line running Pullman Vestibule and Dining Cars between the cities named. THE World's Fair Route. See that your ticket reads C., H. & D. and Monon Route.

E. O. McCORMICK, G. P. & T. Agent,
Cincinnati, O.

THE ROBERT W. HUNT & CO.

Bureau of Inspection, Tests and Consultation.

Rails, Splices and Cars. Analytical and Physical Laboratories. Examination of Iron and Steel Works and advice on Processes.

General Office: The Rookery, Chicago. Branch Offices: Hamilton Building Pittsburgh; 23 Chestnut St. Philadelphia. 80 Broadway, New York.

**IF YOU WANT
A NIAGARA DYNAMO OR MOTOR,**
or if you are a dealer and want an Agency, send for our Catalogue and Price-List.

LOVELL MFG. CO., LTD., ERIE, PA.

LAMBERSON'S

Old Reliable

HARDWARE PRICE BOOKS.

Send for new Illustrated Circular.

BUELL LAMBERSON,

PORTLAND, OREGON.

KEEP BOOKS

by WEST'S New Original-ENTRY LEDGER.

Make the same entry but once. A Ledger in place of a full set of books. Convenient forms for all entries. Easily applied. Simple, saves time. West's Self-Proving Balance locates every error. Send 2-cent stamps for illustrated 16-page pamphlet. WOLCOTT & WEST, SYRACUSE, N. Y.



The Scattergood

Time Record and

Pay Roll Book

(Pat. Oct. 13, 1891.)

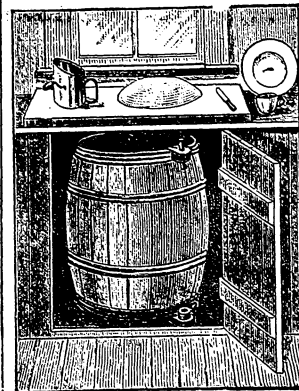
Address for Circular to

HENRY W. SCATTERGOOD,
23 Richmond St., Phila., Pa.

BLOWING ENGINE FOR SALE

Vertical pattern, with balanced steam slide valve gear, steam cylinder 14 in. diameter, air cylinder 40 in. diameter, stroke 24 in. 1 to 100 strokes per minute; engine new.

JAMES LEFFEL & CO., Springfield, Ohio.

**Wonder Somebody Didn't**

THINK OF IT BEFORE!

The Perfection Barrel Swing.

A simple device, readily attached to any Pantry, Cupboard, Broad Shelf or under the counter in a Grocery or Hardware Store, for swinging a barrel to get at the contents easily. Price, \$1. All Hardware dealers will supply them.

MANUFACTURED BY

THE LEAVITT MACHINE CO.

ORANGE, MASS.

Hicks' Builders' Guide.—Comprising an easy, practical system of estimating material and labor for carpenters, contractors and builders. A comprehensive guide to those engaged in the various branches of the building trades. By I. P. Hicks; illustrated by numerous engravings of original drawings. 160 pages; cloth \$1.00

Discussion of the Precision of Measurements, with Examples, taken mainly from Physics and Electrical Engineering. By S. W. Holman, S.B.; 8vo, cloth.....\$2.00

Theory of Structures and Strength of Materials, with Diagrams, Illustrations and Examples. By H. T. Bovey, M.A., D.C.L., F.R.S.C. Contents: Framed Structures, Shearing Forces, and Bending Moments, General Principles, Etc., Stresses, Strains, Earthwork and Retaining Walls, Friction, Transverse Strength of Beams, Pillars, Torsion, Cylindrical and Spherical Boilers, Bridges, Suspension Bridges, Arched Ribs. 834 pages, over 500 cuts. Cloth; 8vo.....\$7.50

The Voltaic Cell. By PARK BENJAMIN, LL.B., Ph.D. Editor-in-chief Appleton's Cyclopaedia of Applied Mechanics, 1880 and 1892; of Modern Mechanism, 1892. Member American Society of Mechanical Engineers—Member American Institute of Electrical Engineers—Foreign Member Chartered British Institute of Patent Agents. 502 pages; copiously illustrated.\$5.00

Manual of Irrigation Engineering. Part I. Hydrography. Part II. Canals and Canal Works. Part III. Storage Reservoirs. By HERBERT M. WILSON, C.E. 8vo, cloth.....\$4.00

Arithmetic of Electricity and Magnetism, with Appendix on Electric Railways. By JOHN T. MORROW, M.E.\$1.00

Buildings and Structures of American Railroads. A Reference Book for Railroad Managers, Superintendents, Master Mechanics, Engineers, Architects and Students. By WALTER G. BERG, C.E., Principal Assistant Engineer, Lehigh Valley Railroad. Over 500 pages and nearly 700 illustrations. 4to, cloth.....\$7.50

The Iron Age Standard Hardware Lists. For use in Price Books. Compiled by R. R. WILLIAMS, Hardware editor of *The Iron Age*. Second edition revised.....\$0.25

Boyd's Map of Southwest Virginia Mineral Resources and Railway Facilities. A Guide for Investors and for Men of Science. All the Ore and Coal areas—Iron, Manganese, Coal, Zinc, Lead, Copper, Sulphur, Tin, Gold and Marble. The Railways, Roads, Streams, Mountains, Towns and their Population, and Leading Industries. The Geology, Scientific and Economic. The palmed structure of great coal fields; the monoclinical upheaval of great iron and manganese bearing formations, as shown in the parallel lines of long mountains and alternate valleys. A Full and Graphic Resume. Twenty-first Edition, corrected to 1893. Price, on cloth, pocket form.....\$5.00

The A B C of Iron. By CHAS. W. Sisson. CONTENTS: IRON—WHAT IS IT?—A description of the metal and its uses, showing in what combinations it is found and the principal resources. PIG IRON—An account of the blast furnace process by which the ores are reduced to pig iron. CONSTITUENTS OF IRON.—A description of the elements in pig metal which influence cast iron. Described in chapters on Carbon in Cast Iron, Phosphorus in Cast Iron, Silicon in Cast Iron, Manganese in Cast Iron, Sulphur in Cast Iron. NUMBERS OF PIG IRON.—Showing the character and analysis of different grades of pig iron, appearance of fracture and the uses to which the several grades are adapted. GRADING OF IRON.—Should it be by analysis or by fracture? HOW TO REDUCE COST OF MIXTURE. STEEL. PHYSICAL PROPERTIES OF METALS. DEFECTS—Table of shrinkage of castings. WEIGHTS OF CASTINGS from patterns, etc. STATISTICS.—Showing the varieties and production of iron ore, pig iron, pig iron and steel products, railroad mileage and equipments, etc., etc., etc. EARLY HISTORY AND MANUFACTURE OF IRON.—Brief history of the manufacture and uses of iron from earliest times, being principally extracts from Mr. James M. Swank's "History of Iron in All Ages." cloth.....\$2.00

The Geometrical Draughtsman. Edited by the editor of "The Industrial Self-Instructor." Being a series of practical diagrams and designs applicable to the work of the architect and builder, the engineer and machinist, the artisan and general draughtsman, in designing the various structures useful in the industrial arts; with a practical paper introductory to the work of industrial drawing and designing by various authors and draughtsmen. 150 pp., cloth.....\$2.00

Sent, postpaid, on receipt of price by

DAVID WILLIAMS Publisher and Bookseller,

96-102 Reade Street, New York.

SITUATIONS WANTED

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

SUPERINTENDENT.—A young man (33), at present in a first-class position as general superintendent of a large manufacturing company, desires to change location owing to health of family; is a thoroughly competent mechanic and able to design and build special labor-saving tools; can handle men and push work; works where at present employed were designed and erected by him, and satisfactorily operated for more than five years; understands manufacture of copper, both wire and sheet; experienced in building heavy machinery and well up in steam engineering; is able to earn at least \$5000 per year; could not make change with less than three months' notice. Address "DESIGN AND BUILD," Box 46, office of *The Iron Age*, 96-102 Reade St., New York.

ADVERTISER is desirous of joining a prosperous manufacturing establishment or mercantile concern located in or near by New York City, where an addition of capital and services is desired and will be remunerative. Address, stating nature of business, "CAPITAL AND SERVICES," office of *The Iron Age*, 96-102 Reade St., New York.

CHEMIST of wide experience and ability is open to an immediate engagement. Address Box 807, office of *The Iron Age*, 59 Dearborn St., Chicago.

BUSINESS MANAGER, Accountant or Treasurer; no objection to travel, if necessary; best of reference given as to ability and integrity. Address "G.," office of *The Iron Age*, 220 South 4th St., Philadelphia.

BY A YOUNG MAN who has had ten years' experience in the hardware and agricultural implement business, a position as hardware salesman or to travel on the road; can furnish the best of reference. Address "TRAVEL," No. 46, office of *The Iron Age*, 96-102 Reade St., New York.

POSITION as Superintendent, Assistant Superintendent or Mechanical Engineer by engineer with 12 years' experience in foundry, machine shop and drawing room; am at present designing and erecting special machinery. Address "M. E.," No. 46, office of *The Iron Age*, 96-102 Reade St., New York.

ASTRaveling Salesman; 20 years' experience in store and on the road, in full line of general and builders' hardware, cutlery, guns and kindred lines; have traveled in Indiana, Illinois, adjacent and other Western States; best references. Address "G. H.," office of *The Iron Age*, 59 Dearborn St., Chicago.

THOROUGHLY competent builders' hardware Salesman, capable of taking work from plans and specifications, wishes position with a good house. Address "M. L.," Box 46, office of *The Iron Age*, 96-102 Reade St., N. Y.

BY PRACTICAL MAN as Superintendent or Foreman of foundry; have had 17 years' experience; understand agricultural and casting work thoroughly; am married; can furnish best of references as to ability and sobriety. Address "FOREMAN," office of *The Iron Age*, 59 Dearborn St., Chicago.

A YOUNG MAN with ten years' experience in shelf and heavy hardware, carriage and blacksmiths' supplies, is open for engagement about April 1st as Salesman or Stockkeeper; salary not so much an object as advancement; can furnish best of references and give security if required. Address "PUSHER," Box 126, Guelph, Ontario.

TO ENGAGE with some first-class iron firm manufacturing both pig and bar iron, to sell strictly on commission; or will engage with some first-class pig-iron firm; am acquainted with trade. Address "G. W. C.," Box 350, office of *The Iron Age*, 96-102 Reade St., N. Y.

FOREMAN in architectural iron works.—Situation wanted by a practical mechanic; energetic and reliable; 15 years' experience as foreman; familiar with cast and wrought plain and ornamental iron work, iron fronts, structural work, stairs, railings, elevator enclosures, doors, window guard, fire escapes, &c.; accustomed to plans and handling men; all references. Address "H. J.," Box 316, office of *The Iron Age*, 96-102 Reade street, New York.

AS BLAST FURNACE Manager, with a thorough knowledge of the business, capable of taking entire charge of blast furnace plant; can furnish best of references. Address "BLAST FURNACE MANAGER," office of *The Iron Age*, 96-102 Reade St., New York.

AS CHEMIST for an iron or steel plant by an experienced chemist; best of reference given. Address "I. OR S. PLANT," office of *The Iron Age*, 96-102 Reade St., New York.

AS SUPERINTENDENT of iron or steel mill by a thorough practical mill superintendent; am especially adapted for position as builder of mills, having built four or five, and can furnish best of references from former employers; will go to any part of America or Mexico; will accept position as assistant superintendent. Address "BUILDER," office of *The Iron Age*, 96-102 Reade St., New York.

BY A FIRST-CLASS Draftsman, graduated and having practical experience in steam and general machinery, a position as Assistant to Superintendent or as Chief Draftsman. Address "GENERAL MACHINERY," office of *The Iron Age*, 96-102 Reade St., New York.

BY PRACTICAL MAN, position as Superintendent of manufactory making locks and builders' hardware; 25 years' experience as foreman and superintendent; understands brass and iron founding, pattern and die making thoroughly; can handle men and material economically; have been with some of the largest firms in the country; recommendations. Address "L. A. H.," Box 316, office of *The Iron Age*, 96-102 Reade St., New York.

A GENTLEMAN with 25 years' experience in the iron, steel and metal jobbing and importing business in New York wants to represent a manufacturer or dealer in this city. Address "M. & D.," office of *The Iron Age*, 96-102 Reade street, New York.

RESPONSIBLE position wanted by a graduated chemist and engineer; superintendency or assistant superintendency in steel works or blast furnaces preferred; is a metallurgist and can burden furnace; is well up in modern engineering practice; thoroughly understands machinery and the economies of production; can design and build mills or furnace plants. Address "MODERN ENGINEERING," office of *The Iron Age*, 96-102 Reade St., N. Y.

ASSISTANT SUPERINTENDENT of rolling mills, by a practical and experienced man, age 42; well up in all the details of mill work, both iron and steel, plates and sheets, skelp, bar, guide and structural work; can use gas, oil and coal fuel; best of references. Address "PLATES AND SHEETS," office of *The Iron Age*, 96-102 Reade Street, New York.

HELP WANTED.

Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

RESIDENT and traveling Salesmen, energetic and reliable men, to carry and push as side line a patent first-class forged steel and useful mechanical tool. Address "K.," Letter Carrier 15, Buffalo, N. Y.

IMMEDIATELY.—Foreman for a machine shop; must thoroughly understand both engine and rolling mill work; able to handle 200 men and bring the best of recommendations. Address "FOREMAN," office of *The Iron Age*, 509-510 Hamilton Building, Pittsburgh, Pa.

A FIRST-CLASS Boiler Maker to take charge of a large and latest equipped boiler shop; must be thoroughly posted on quick boiler construction; good salary to the right man. Address, giving references and where now employed, "QUICK," office of *The Iron Age*, 96-102 Reade St., New York.

TO CORRESPOND with a first-class sober and industrious Galvanizer and Tinner on cast and wrought iron; a good place in view for a capable man who can give good references and is not too high priced. Address "GALVANIZER AND TINNER," office of *The Iron Age*, 96-102 Reade St., New York.

A LIVE and energetic man who understands drafting and is capable of supervising mechanical department of a large manufacturing plant; must be a thorough mechanic; state reference, experience and salary wanted. Address "SUPERVISING," office of *The Iron Age*, 96-102 Reade St., New York.

FIRST-CLASS HEATER wanted on 10-inch mill, two helpers; good wages, steady work. Address, with references, "ROLLING MILL," Box 46, office of *The Iron Age*, 96-102 Reade street, New York.

FOREMAN to take charge of press room; one who is familiar with the manufacture of railroad lanterns; a thoroughly competent man will have a very good position. Address "PRESS ROOM," office of *The Iron Age*, 96-102 Reade St., New York.

SALESMEN wanted to take the Jack Frost Freezer as a side line. JACK FROST FREEZER Co., 29 Murray street, New York.

ENGINEER to travel and sell iron and steel roofs and buildings. Address, stating age, experience and salary expected, THE BERLIN IRON BRIDGE Co., East Berlin, Conn.

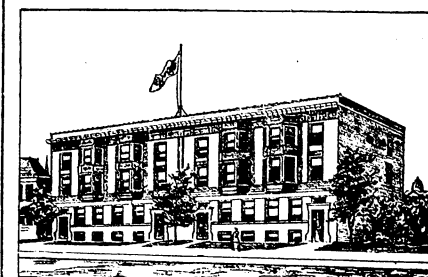
BUSINESS MANAGER; energetic man with business abilities wanted for metal and silver-ware factory, to take position as Secretary and Treasurer in company. Address "SECRETARY AND TREASURER," office of *The Iron Age*, 96-102 Reade St., New York.

A MASON accustomed to fire brick work and able to construct and repair reverberatory melting and heating furnaces; references regarding character and ability required. Address "MASON," Box 323, office of *The Iron Age*, 96-102 Reade St., New York.

SALESMAN to carry a patented article for the hardware trade as a side line on a commission. THE HATCH & HOLMES MFG. Co., Bridgeport, Conn.

AN ENGINEER and Machinist to assume general charge of the steam plant and all the machinery in a rolling mill; duties to include running an engine part of the time; a young man is preferred who is thoroughly posted in the most economical methods of generating and using steam, and who is competent to direct and superintend repairs and alterations; recommendations of ability and character required. Address "B. F. H.," Box 336, office of *The Iron Age*, 96-102 Reade St., N. Y.

SALESMEN wanted on commission.—Manufacture, established 25 years, wants to increase its business by pushing article of easy sale to hardware trade. Address "MORGAN," office of *The Iron Age*, 96-102 Reade St., N. Y.



The Exposition opens May 1st.

THE :: AUDUBON

OPENS MAY 1ST.

Make your engagements early.

**The Hardware Trade
The Iron Trade
The Metal Trades**

Go to THE AUDUBON.

The Audubon is stone and brick; fire-proof. Reasonable prices.

Send for catalogue with diagrams of floors, table of rates, &c.

MONTROSS & COOLIDGE,

BUSINESS OFFICE:

1433 Masonic Temple, Chicago.

NONPAREIL

Ratchet Wrenches.

Made of best forged Tool Steel; are easily and readily adjusted and controlled. Can be made reversible instantly without removing from their work by throwing over the lever in slot of the handle.

The Set of Combination Tools No. 1 includes the wrench, two sockets, one for screw-driver, bit or reamer shank, with wood handle, and one socket



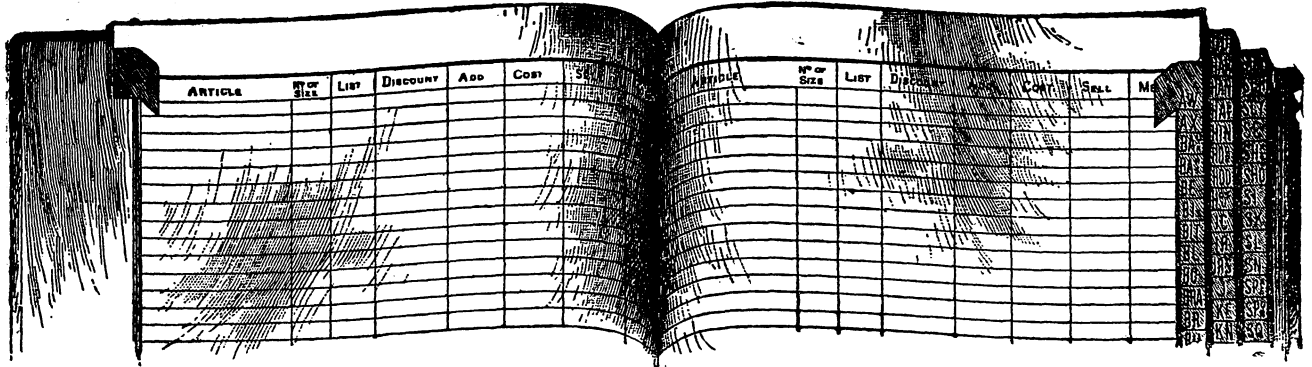
for drill shank and feed nut. The jaws on this wrench open from 3-16 to 1 1/4 inches.

Send for Illustrated Circular and Price-list of various sizes.

The Keystone Mfg. Co.,
312 Terrace, Buffalo, N. Y.

The Iron Age Hardware Price Book E,

SECOND EDITION, WITH MULTIPLE INDEX (Patent pending).



SIZE.—The book is 7 x 10 inches (much larger than Price Books A, B, C or D), 350 pages.

PAPER.—The paper is the celebrated Crane's heavy ledger paper, tough and strong, permitting frequent changes and erasures.

BINDING.—The binding is of the very best quality—flexible seal grained leather with pocket.

INDEX.—By means of the arrangement shown in the cut the index applies to every page (except Supplement) and permits reference to any article at a single motion. This greatly facilitates the use of the book, avoiding the troublesome turning from page to page which is necessary in connection with other Price Books. It has been prepared with great care, and it is believed that it provides a place for every article in the Hardware line.

ARRANGEMENT.—The book is arranged to keep a complete record of prices on a single page, the width giving sufficient room.

SUPPLEMENT.—A 40-page Supplement is provided to give room for supplemental quotations, memoranda, tables, &c. This book is issued in only one edition, **Price, \$5.00.**

AD	CU	SCB
AN	HA	SCR
AU	HAN	SCY
AW	HA	SE
AX	HIN	SH
BA	HOP	SHO

Fac-Simile of Indexing.

Advantages of Multiple Index Price Book.

A SPECIAL feature of the book is the arrangement of the index characters, which instead of being alphabetical are arranged with special reference to the classification of Hardware goods, each index character giving the first two or three letters of the names of Hardware articles as shown above.

The ease and convenience with which the book can be used is indicated in the following examples:

For Augers,	turn to	AU	For Chisels,	turn to	CHI	For Iron,	turn to	IR
" Apple Parers,	"	PA	" Cutlery,	"	CU	" Irons,	"	IR'S
" Saws,	"	SAW	" Cartridges,	"	CAR	" Shovels,	"	SHO
" Pumps,	"	PUL	" Rules,	"	RU	" Grindstones,	"	GRI
" Bits,	"	BIT	" Locks,	"	LO	" Stones,	"	STO

Special care has been taken to make the classification as indicated in the index correct and comprehensive, making provision for all Hardware articles and giving sufficient space for the keeping and recording of prices. It is thought that every strictly Hardware article has its first two or three letters given, thus permitting immediate reference to it by a single motion.

It is, however, obvious if any articles are not directly designated by the index characters, that the index being alphabetical in its arrangement indicates the place where quotations on such articles should be recorded. The supplement, however, may be found useful for quotations on any outside goods which the Hardwareman may desire to keep prices on, while at the same time it may be used if necessary for any overflow of matter from the preceding pages, or to contain list prices or other matter relating to goods.

Hardware Classification.—A pamphlet containing a classification of the leading Hardware articles is furnished with the price book.

Standard Lists.—In connection with this price book a set of *The Iron Age* STANDARD HARDWARE LISTS can be used with great advantage.

This price book, which has been prepared by R. R. Williams, Hardware Editor of *The Iron Age*, is presented to the attention of Hardwaremen on the confidence that it will be found a most valuable aid in keeping track of prices.

WRIGHT'S BUSINESS METHODS,

—OR THE—

Wright Key to Double-Entry Bookkeeping, Wholesale and Retail Business.

How the books are conducted; every book described and exemplified; its usage explained in minute detail; a full set of books in a completed state, containing 1500 business-like entries.

JOINT STOCK ACCOUNTS.

Comprehension of the subject at last reached; capital stock; preferred stock; common stock; watered stock; fictitious accounts not permissible, in fact not necessary; how avoided; "working capital" a misnomer; stock all taken; stock not all taken; nominal capital; actual capital; stock sold above par; stock sold below par; stock given away; dividend and sinking fund.

Importing Business; also Manufacturing.

How the books are conducted in each; their wonderful details explained in a way to reach your comprehension and meet your requirements; information not contained in any other publication.

Expert Accounting and Chartered Accountants; What it Means; Their Methods Explained.

By PRINCE ALBERT WRIGHT, Practical Bookkeeper and Consulting Accountant,

PRICE, \$2.50.

Any book published sent, postpaid, on receipt of price by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Reade St., N. Y.

Ladd's Discount Book

Is indispensable to every one using percentage, as it is a practical means for rapidly reaching absolutely accurate results without the mental wear of computing, avoiding any possibility of error.

A few days' use will verify the claim that the book is accurate, rapid, convenient and practical.

The New Way.

Put Your Finger Right on it.

60, 10, 10, 7½ & 2½. Same as 55, 50, 10, 7½ & 2½. 40, 35, 10, 10, 7½ & 2½. 30, 25, 10, 10, 7½ & 2½. 20, 15, 10, 10, 7½ & 2½. 10, 5, 10, 10, 7½ & 2½.									
100.29.22	110.31.43	210.61.64	310.90.84	411.19.05	511.48.26	611.77.47	712.06.67	812.35.88	912.65.09
200.58.44	120.60.65	220.62.86	320.93.06	421.22.27	521.51.48	621.80.69	722.09.90	822.39.11	922.68.32
300.87.66	130.62.87	230.65.08	330.95.28	431.24.49	531.53.70	631.82.91	732.12.12	832.41.33	932.70.54
401.16.88	140.65.09	240.67.30	340.97.50	441.26.71	541.55.92	641.85.13	742.14.34	842.43.55	942.72.76
501.46.10	150.67.31	250.69.52	350.99.72	451.28.93	551.58.14	651.87.35	752.16.56	852.45.77	952.74.98
601.75.32	160.69.53	260.71.74	360.10.15	461.39.36	561.68.57	661.97.78	762.26.99	862.56.20	962.85.41
702.04.55	170.71.75	270.73.96	370.10.16	471.39.37	571.68.58	671.97.79	772.26.99	872.56.20	972.85.41
802.33.77	180.73.97	280.76.18	380.12.38	481.41.59	581.70.80	681.99.01	782.28.22	882.57.43	982.86.64
902.62.99	190.76.19	290.78.40	390.14.60	491.43.81	591.73.02	692.02.23	792.31.44	892.60.65	992.89.86
1002.92.21	200.78.41	300.80.62	400.16.82	500.17.03	600.46.24	700.75.45	801.04.66	901.33.87	1001.63.08

60, 10, 10, 7½ & 5. Same as 55, 50, 10, 7½ & 5. 40, 35, 10, 10, 7½ & 5. 30, 25, 10, 10, 7½ & 5. 20, 15, 10, 10, 7½ & 5. 10, 5, 10, 10, 7½ & 5.									
100.28.47	110.31.19	210.61.90	310.90.82	411.19.73	511.48.64	611.77.55	712.06.46	812.35.37	912.64.28
200.56.94	120.63.41	220.65.37	320.94.28	421.23.19	521.52.10	621.81.01	722.10.92	822.39.83	922.68.74
300.85.41	130.65.13	230.67.09	330.96.00	431.24.91	531.53.82	631.82.73	732.11.64	832.40.55	932.69.46
401.13.89	140.66.85	240.68.81	340.97.72	441.26.63	541.55.54	641.84.45	742.13.36	842.42.27	942.71.18
501.42.36	150.68.57	250.70.53	350.99.44	451.28.35	551.57.26	651.86.17	752.15.08	852.43.99	952.72.90
601.70.83	160.70.29	260.72.25	360.10.16	461.39.07	561.68.98	661.97.89	762.26.80	862.55.71	962.84.62
701.99.30	170.72.01	270.73.97	370.12.02	471.40.93	571.69.84	671.98.75	772.27.66	872.56.57	972.85.48
802.27.77	180.73.73	280.75.69	380.13.70	481.42.95	581.71.86	682.00.77	782.29.68	882.58.59	982.87.50
902.56.24	190.75.45	290.77.41	390.15.72	491.44.97	591.73.88	692.02.79	792.31.70	892.60.61	992.89.52
1002.84.71	200.77.17	300.79.13	400.17.94	500.19.95	600.48.86	700.77.77	801.06.68	901.35.59	1001.64.50

60, 10, 10, 7½, 5, 2. Same as 55, 50, 10, 7½, 5, 2. 40, 35, 10, 10, 7½, 5, 2. 30, 25, 10, 10, 7½, 5, 2. 20, 15, 10, 10, 7½, 5, 2. 10, 5, 10, 10, 7½, 5, 2.									
100.27.90	110.30.62	210.61.33	310.90.24	411.19.15	511.48.06	611.76.97	712.05.88	812.34.79	912.63.70
200.55.86	120.62.34	220.64.30	320.93.21	421.22.12	521.51.03	621.79.94	722.08.85	822.37.76	922.66.67
300.83.71	130.64.06	230.66.02	330.94.93	431.23.84	531.52.75	631.81.66	732.10.57	832.39.48	932.68.39
401.11.61	140.65.78	240.67.74	340.96.65	441.25.66	541.54.57	641.83.48	742.12.39	842.41.30	942.70.21
501.39.51	150.67.50	250.69.46	350.98.37	451.27.48	551.56.39	651.85.30	752.14.21	852.43.12	952.72.03
601.67.41	160.69.22	260.71.18	360.10.09	461.39.00	561.67.91	661.96.82	762.25.73	862.54.64	962.83.55
701.95.31	170.70.94	270.72.90	370.11.81	471.40.72	571.69.63	671.98.54	772.27.45	872.56.36	972.85.27
802.23.22	180.72.66	280.74.62	380.13.53	481.42.44	581.71.35	682.00.26	782.29.17	882.58.08	982.86.99
902.51.12	190.74.38	290.76.34	390.15.44	491.44.26	591.73.17	692.02.08	792.30.99	892.59.90	992.88.81
1002.79.02	200.76.10	300.78.06	400.17.91	500.19.82	600.48.73	700.77.64	801.06.55	901.35.46	1001.64.37

60, 10, 10, 7½. Same as 55, 50, 10, 7½. 40, 35, 10, 10, 7½. 30, 25, 10, 10, 7½. 20, 15, 10, 10, 7½. 10, 5, 10, 10, 7½.									
100.27.66	110.30.38	210.61.09	310.90.00	411.18.91	511.47.82	611.76.73	712.05.64	812.34.55	912.63.46
200.55.62	120.62.40	220.64.36	320.93.27	421.22.18	521.51.09	621.79.99	722.08.90	822.37.81	922.66.72
300.83.28	130.64.12	230.66.08	330.94.99	431.23.90	531.52.81	631.81.72	732.10.63	832.39.54	932.68.45
401.11.04	140.65.84	240.67.80	340.96.71	441.25.62	541.54.53	641.83.44	742.12.35	842.41.26	942.70.17
501.38.80	150.67.56	250.69.52	350.98.43	451.27.44	551.56.35	651.85.26	752.14.17	852.43.08	952.71.99
601.66.66	160.69.28	260.71.24	360.10.15	461.39.06	561.67.97	661.96.88	762.25.79	862.54.70	962.83.61
701.94.52	170.71.00	270.72.96	370.11.07	471.40.98	571.69.89	671.98.80	772.27.71	872.56.62	972.85.53
802.22.08	180.72.72	280.74.68	380.13.59	481.42.50	581.71.41	682.00.32	782.29.23	882.58.14	982.87.05
902.49.84	190.74.44	290.76.40	390.15.50	491.44.41	591.73.32	692.02.23	792.31.14	892.59.05	992.88.96
1002.77.60	200.76.16	300.78.12	400.17.97	500.19.88	600.48.79	700.77.70	801.06.61	901.35.52	1001.64.43

BOOK.

The hand points to the net of

73 cents,	21 cents.
\$7.30	\$2.13
\$73.00	\$21.33
\$730.00	\$213.31
\$7,300.00	\$2,133.11
\$73,000.00	\$21,331.10

ables, reduced in size, from
ADD'S DISCOUNT BOOK.

If the amount was, say \$73.45, add the net of 45 cents, which the table shows is 13 cents, total net \$21.46.

Accurate, Rapid, Convenient and Practical.

Regular Edition, Handsomely Bound in Cloth, Full Indexed,
Double Indexed Edition, Handsomely Bound in Cloth, Double Indexed all-through,

each, \$3 00

" 4 00

Sent, Postpaid, on Receipt of Price by

DAVID WILLIAMS, - - - Publisher and Bookseller,

96-102 Reade Street, New York.

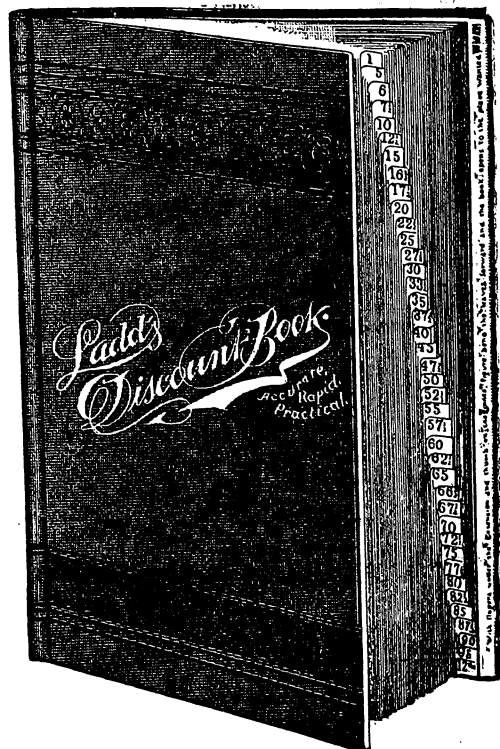
Hosted by Google

The Old way

Net of \$73.00 at discount 60, 10, 10, 7½ + 2½ per cent.

60/- 73.00
10/- 43.80
10/- 29.20
7½/- 2.92
2½/- 26.28
23.652
1.7739
21.8781525
5.469508
16.408575
21.33.11 475
11826
5913
17739

And you cannot feel sure of this till you prove it, after all your figuring, because it is so easy to make a mistake in figuring or misplace the figures as I did in working out the above example. The new way is Accurate, Rapid and Practical.



The full size of the book is 7½x10 inches.
The sample page herewith is reduced in size.

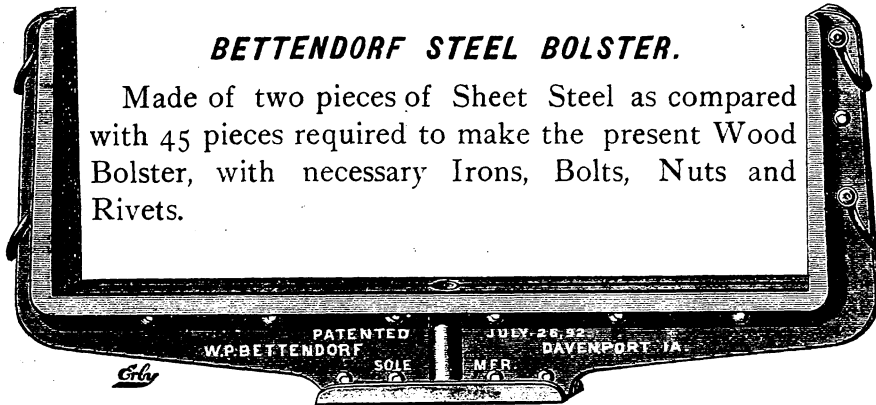
BETTENDORF HOLLOWSTEEL WAGON AXLES, BOLSTERS AND STAKES.

BETTENDORF STEEL BOLSTER.

Made of two pieces of Sheet Steel as compared with 45 pieces required to make the present Wood Bolster, with necessary Irons, Bolts, Nuts and Rivets.

25 %

Less in weight than wood axles of equal strength.



GUARANTEE.

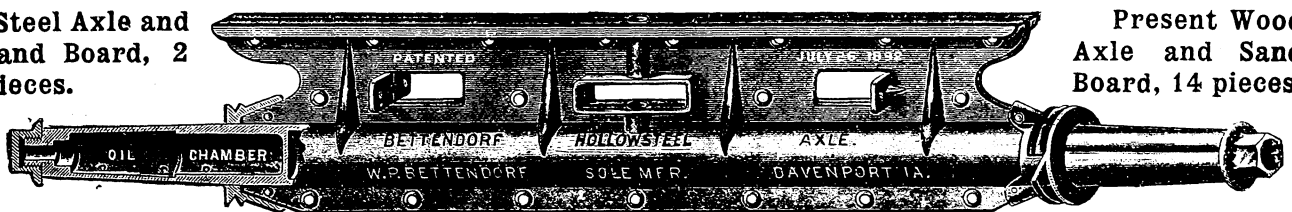
Every axle and bolster warranted.

Any axle broken will be replaced free of charge.

FRONT AXLE AND SAND BOARD.

Steel Axle and Sand Board, 2 pieces.

Present Wood Axle and Sand Board, 14 pieces.



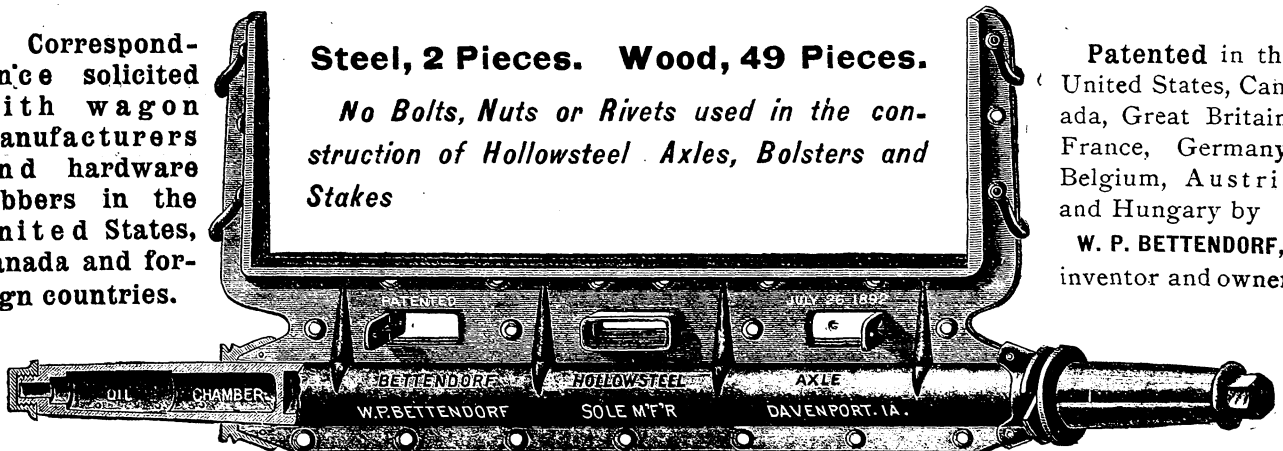
BETTENDORF COMBINED STAKES, BOLSTER AND SELF-OILING HOLLOWSTEEL AXLE.

Correspondence solicited with wagon manufacturers and hardware jobbers in the United States, Canada and foreign countries.

Steel, 2 Pieces. Wood, 49 Pieces.

No Bolts, Nuts or Rivets used in the construction of Hollowsteel Axles, Bolsters and Stakes

Patented in the United States, Canada, Great Britain, France, Germany, Belgium, Austria and Hungary by
W. P. BETTENDORF,
inventor and owner.



Diameter and length of Axle Bearings same as Trade Skeins of same size, and are self-oiling. For descriptive catalogue and price-list apply to

BETTENDORF HOLLOWSTEEL AXLE WORKS,
DAVENPORT, IOWA, U. S. A.

THE STEEL AND IRON IMPROVEMENT CO.,

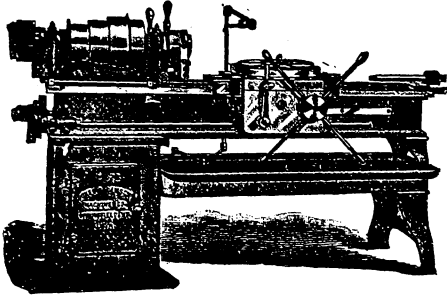
Controlling the Adams-Blair Process and other Steel and Iron Patents.

High Grade Open Hearth Steel produced by the Adams-Blair Process at less than the Cost of BESSEMER Steel.

91 and 98 Fifth Ave., Pittsburgh, Pa.

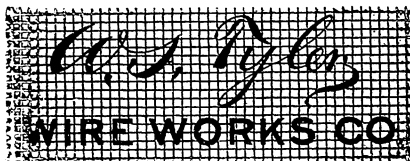
EASTERN OFFICE: 412 Drexel Building, Philadelphia, Pa.

2 BY 24 FLAT TURRET LATHE.



SEND FOR CATALOGUE FOR '92.

Jones & Lamson Machine Co.,
SPRINGFIELD, VERMONT, U. S. A.



MANUFACTURERS OF

"The Tyler"

Double Crimped Wire Cloth for Mining Purposes.

All meshes from two to the inch up to 100 mesh, made and carried in stock.

W. S. TYLER, Pres. PROCTOR PATTERSON, Sec. & Treas
CLEVELAND, OHIO.

ANALYTICAL AND ASSAY **LABORATORIES**

— OF —

DR. GIDEON E. MOORE,
221 PEARL ST., (Corner Platt St.,) NEW YORK.

Assays of Ores, Metals and Metallurgical Products of every description. Analysis of Water, Ores, Minerals, Metals, Fuel, and Natural and Industrial Products generally.
PRINTED PRICE-LIST ON APPLICATION.

ALUMINUM.

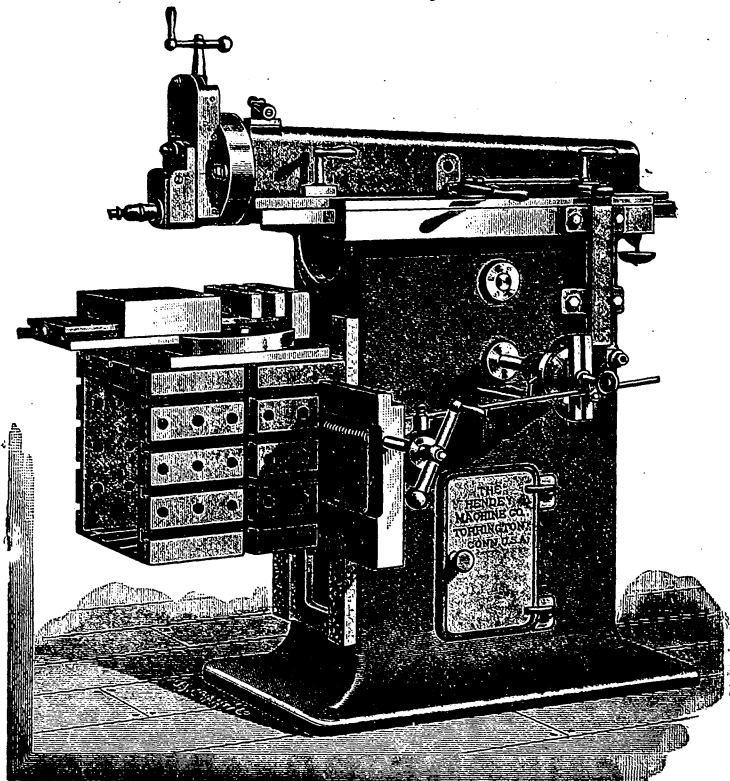
The Pittsburgh Reduction Co.,

116 Water St., Pittsburgh, Pa.,

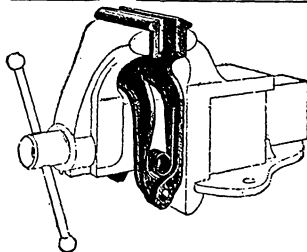
Offer Aluminum guaranteed equal in purity to the best in the market, at lowest rates obtainable.

ALUMINUM SHEET, WIRE,
AND CASTINGS.

THE HENDEY MACHINE CO., TORRINGTON, CONN.



Heavy 25 inch Pillar Shaper with power down feed, large vise and many improvements.



STOP marring your finished work.

USE our Spring Vise Jaws for tender work.

SEND FOR INFORMATION TO

The Newark Machine Tool Works, Newark, N. J.

Blades of Grass

From the Knives of
The Stearns Lawn Mower.

Ease of Running.

Thorough Construction.

Precision of Cutting.

Finest Material.

Best of all—the ease.

E. C. Stearns & Co.,

Syracuse, N. Y.

THE METAL WORKER ESSAYS

—ON—

HOUSE HEATING

—BY—

STEAM, HOT WATER and HOT AIR
With Introduction and Tabular Comparisons.

Second edition, revised. To which has been added a selection from the Letters of Criticism on the Essays as originally published in THE METAL WORKER and a chapter on Proportioning Radiating Surfaces by JOHN J. HOGAN.

"We are disposed to consider this volume one of the most valuable books extant on house heating, for the reason that it presents the particular ideas of different men who are actively engaged in the work described."—*The California Architect and Building News*.

"This will prove of benefit to all interested in the subject of heating, whether a buyer, seller or user."—*The Steam and Hot Water Fitters' Register and Bulletin*.

"It will be found as complete a compendium as possible of existing information on this subject, amply illustrated by drawings."—*The Sanitary Era*.

407 pages, 7 x 9½ inches. Handsomely bound in cloth. One volume.

PRICE \$3.00.

Sent, post-paid, on receipt of price, by

DAVID WILLIAMS, PUBLISHER, 96-102 Reade St., New York.

White Mountain Freezers.

KNOWN AND APPRECIATED THE WORLD OVER.

RESULT:—The Largest Sale of any Freezer on the market



The "Arctic" Best Freezer at a low price ever introduced.

Are You Selling Them?

WRITE US.

THE WHITE MOUNTAIN FREEZER CO., Nashua, N. H.



THE OLD RELIABLE STANDARD FREEZER

has the reputation of being the BEST ICE CREAM FREEZER ever introduced. STRENGTH, DURABILITY, NEATNESS AND EFFICIENCY are prominent points in the manufacture. Full Size Can, CEDAR TUB, Detachable Hinged Crossbar, Self-adjusting Vibratory Scraper, etc.

Write for Illustrated Circular, Price-List and Discounts of STANDARD, EXPERT, MODEL and MACHINE Freezers.

CHAS. W. PACKER, Mfr.,

20 North Fourth Street, Philadelphia.

THE "New" Keystone Beater,

FOR
WHIPPING
AND
BEATING

EGGS.

MIXING

BATTERS, DRINKS,
SAUCES, ICINGS,
POWDERS, ETC.

CREAMING

MELLOW FRUITS,
BANANAS, PEACHES,
BERRIES,
BUTTER & SUGAR.

No. 20 for Family Use.

JAR ENTIRELY COVERED.

No more Spattering.

CAN BE USED ANYWHERE.

Standing or Sitting.

ALWAYS READY FOR USE.

Nothing to be fixed.

SIMPLY PERFECT.

No. 20.—Jar holds 1 quart level full.
Complete Machine securely packed in one single package.
½ dozen packed in case.

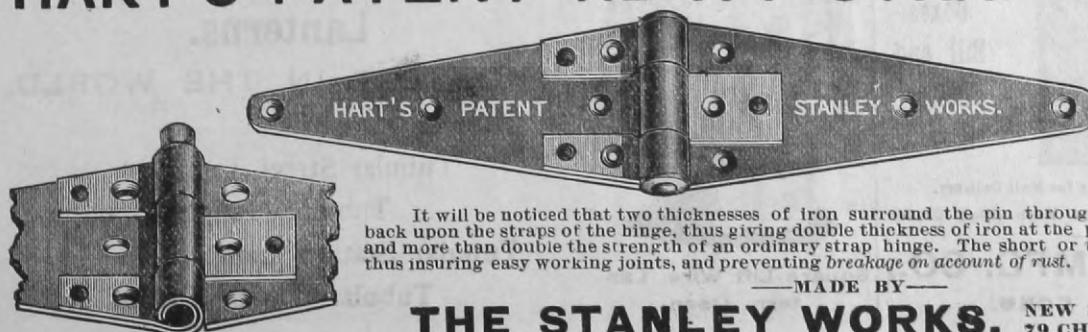
MANUFACTURED ONLY BY

NORTH BROS. MFG. CO.,

Manufacturers of Hardware Specialties for Household use
American St. and Lehigh Ave., Philadelphia, Pa., U. S. A



HART'S PATENT HEAVY STRAP HINGES.



It will be noticed that two thicknesses of iron surround the pin throughout its length and extend back upon the straps of the hinge, thus giving double thickness of iron at the points where most needed and more than double the strength of an ordinary strap hinge. The short or inside leaves are galvanized thus insuring easy working joints, and preventing breakage on account of rust.

—MADE BY—

THE STANLEY WORKS, NEW BRITAIN, CONN.
79 CHAMBERS ST., N. Y.



We are
always anxious to
secure live, responsible
agents.



ROUSE-DURYEA CYCLE CO., 146 G St., Peoria, Ill



"It is so nominated in the bond."

Warranted
Columbias.

With every Columbia is a warrant—backed by the oldest bicycle house in America—the largest in the world—a factory which does not turn out poor work—a plant of superlative excellence in machinery and skilled workmen—a million dollars paid in capital—a large surplus—a reputation unmatched in cycloedom—all these things guarantee the Columbias—Folks make no mistake in Columbia buying—Book about Columbias, too good for a Catalogue—45 beautiful engravings—easy to read—comprehensive—free at Columbia agencies—by mail for two two-cent stamps.

POPE MFG. CO.,

BOSTON. NEW YORK. CHICAGO.
HARTFORD.

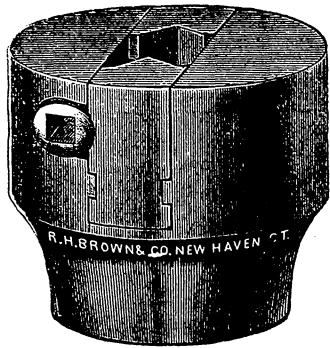
REID DRILL CHUCKS.

THREE SIZES.

No. 0 takes any drill from 0 to 1-2 inch inclusive.

No. 1 " " " " 0 " 3-4 " "

No. 2 " " " " 0 " 1 " "



They are the strongest and most durable made. Drill absolutely in the center. No twisting or bending necessary if drill is straight. Can be fitted to hollow spindle lathes for working long rods.

SEND FOR CIRCULAR.

R. H. BROWN & CO., - New Haven, Conn.

You take no risk on the quality
We make only the best!



**Sand
Papers**

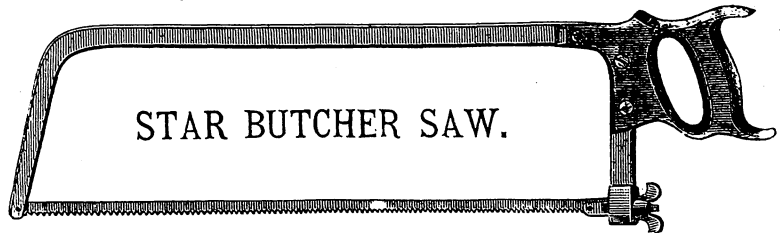
IN
Reams and Rolls

Flint Paper
Garnet Paper
Emery Paper
Emery Cloth

AIR FELTING for covering Boilers, Steam and
Water Pipe, and lining Refrigerators.

BAEDER, ADAMSON & CO.

730 MARKET STREET, PHILADELPHIA.
67 BECKMAN STREET, NEW YORK.
143 MILK STREET, BOSTON.
182 LAKE STREET, CHICAGO.



STAR BUTCHER SAW.

Flat crucible steel backs, polished. Beech handle, polished edges, three brass screws.

Price of the Handles without Blades:

Inches,	14	16	18	20	22	24
Per dozen..	\$8.00.	\$9.00.	\$10.00.	\$11.00.	\$12.00.	\$13.00.

STAR BUTCHER ★ SAW BLADES.

Length.	Width.	Gauge.	Teeth to inch.	Per doz.
14 and 16 inches.	$\frac{1}{2}$ inch.	24	$9\frac{1}{2}$	\$1.08
18 " 20 "	$\frac{1}{2}$ "	24	$9\frac{1}{2}$	1.20
22 " 24 "	$\frac{3}{4}$ "	24	$9\frac{1}{2}$	1.32

A Common Butcher's Saw Blade costs 50 cents; it is usually filed about 150 times, and at a cost of 10 cents a time, \$15.00. Two dozen Star Butcher Saw Blades will do the same amount of work, they cost \$1.32 per dozen and are never to be filed. If the dealer makes 25 per cent.

In selling 24 Star Blades for \$2.64 he gets	-	-	-	-	66c.
" " 1 Common " .50	-	-	-	-	12 $\frac{1}{2}$ c.
A clear gain of	-	-	-	-	53 $\frac{1}{2}$ c.
The Butcher pays for 1 common blade and filing,	-	-	-	-	\$15.50
" " " " 24 Star " no "	-	-	-	-	2.64
A clear gain of	-	-	-	-	\$12.86

As the Star Saw is never to be filed, it is tempered six times as hard as the common saw, and will last six times as long without filing. A great change is taking place in this Butcher Saw business.

MILLERS FALLS CO.,

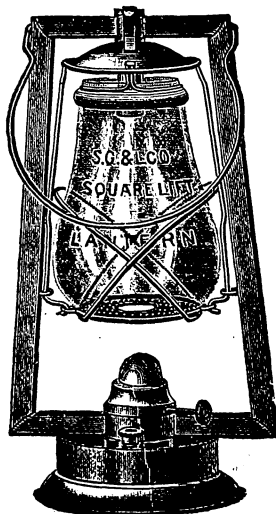
93 READE ST., NEW YORK.



Office and House Boxes for Mail Delivery.
House Furnishing Japanned Ware (High Grade).

MERRIAM MFG. CO.,
DURHAM, CONN.

Specialties
for the
Hardware
Trade.
Cash and
Bond
Boxes.
Bill and
Change
Boxes.



Square Lift Wire Lan-
tern. Open.

Steam Gauge AND Lantern Co.

Syracuse, N. Y.

Western Branch: 25 Lake St., Chicago, Ill.

—MANUFACTURERS OF—

Standard Tubular Lamps and Lanterns.

THE BEST IN THE WORLD,
Tubular Lanterns,

Tubular Street Lamps,

Tubular Hanging Lamps,

Tubular Station Lamps,

Tubular Driving Lamps, etc.

THE YALE & TOWNE MFG. COMPANY,

OWNING AND OPERATING

THE YALE LOCK MFG. COMPANY.

THE WESTON CRANE COMPANY.

Lessee, Branford Lock Works.

OFFICE AND WORKS, STAMFORD, CONN.

Ornamental Metal Work, Locks and Builders' Hardware for every purpose.

Catalogues and full information furnished on application at any of our houses.

NEW YORK.

CHICAGO.

PHILADELPHIA.

BOSTON.

84-86 Chambers Street. 152-154 Wabash Ave.

1120 Market St.

224 Franklin Street.

THE DEALER who sells what
THE PEOPLE ask for

MAKES FRIENDS and MONEY, and
SAVES TIME and TROUBLE.

The people ask for

LePage's Liquid Glue,

And the people are right.

It is the strongest and best glue made. It has been imitated, but never equalled. Be sure to get what you order and ACCEPT NO SUBSTITUTES.

Our name is on every label

RUSSIA CEMENT CO.,
GLOUCESTER, MASS.

New York Office, 95 Reade and 113 Chambers Streets.
Pacific Coast Office, 23 Davis Street, San Francisco, Cal.

**'STEEL RULES,
HARDENED ENDS.'**

Also a full line of

MACHINISTS' FINE TOOLS.

If you haven't our 1893 catalog send us a postal card.

STANDARD TOOL CO.,

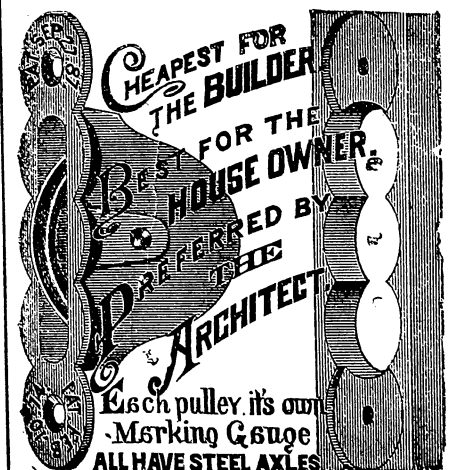
ATHOL, MASS., U. S. A.

ATHOL MACHINE CO., Selling Agents.

IT PAYS. Nothing about a Hard ware Store looks so well as clean shelves and the goods neatly boxed with a fresh sample on the front. Customers are attracted by such a display of care, and notice and buy things that would ordinarily go without notice. The Boxes are inexpensive, save the goods, make a big show for a small investment and help the salesman. Send to

JESSE JONES & CO., Philadelphia.
for Catalogue of prices, styles and references.

Palmer's Common Sense Frame Pulley



MANUFACTURED BY

PALMER HARDWARE MFG. CO., Troy, N.Y.

ELIZABETHPORT CORDAGE CO.

Manufacturers of

ROPE AND BINDER TWINE,

46 South Street, New York.

W. & B. DOUGLAS, MIDDLETOWN, CONN.

Branch Warehouses: 85 and 87 John St., New York; 197 Lake Street, Chicago, Ill.

THE OLDEST AND MOST EXTENSIVE MANUFACTURERS OF

Pumps, Hydraulic Rams, Garden Engines,

Yard Hydrants, Street Washers, Galvanized Pump Chain, Wind Mill Pumps and other Hydraulic Machines in the World.

DOUGLAS' DIAPHRAGM PUMPS, "Loud Patent."

A LARGE CAPACITY, AND EASY WORKING PUMP FOR

Water Works, Sewer Contractors, Foundation Builders, Mines, Quarries,

Fig. 180.

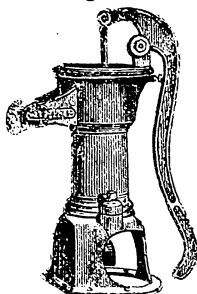


Fig. 70.



or wherever it is desired to raise a large quantity of water by hand power.

The pump has large valves (accessible by hand) and will pump water containing sand, gravel, sewage matter, &c., without choking or any perceptible wear.

Capacity from 3,000 to 4,500 gallons per hour.

These pumps are simple, durable and low priced.

Made either as shown in cut for Hose or for IRON Pipe Suction underneath.

Send for Circular and Price List.

Fig. 209.

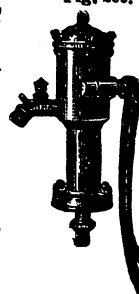


Fig. 381



THE DEMING
FACTORY
SALEM O.U.S.A.
MANUFACTURERS OF
HAND & POWER PUMPS, WELL SUPPLIES & C. VERTICAL STEAM PUMPING ENGINES.
N.Y. OFFICE: 72 JOHN ST.
MONTICELLO & HUBBELL
GEN'L. WESTERN AGT.: 55 & 57 N. CLINTON ST. CHICAGO, ILL.

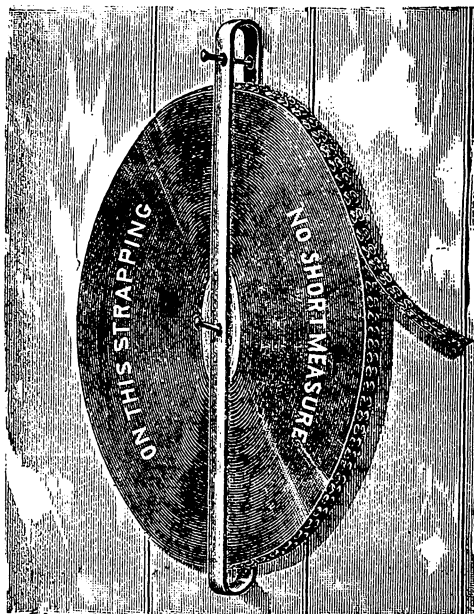
F.E. MYERS & BRO.

WORLD'S FAIR
PUMPS
ASHLAND O.
+ CATALOGUES FREE +
Ashland Pump and Hay Tool Works.

KOCH PAT. SHIFTABLE REVERSIBLE BRACKETS
for SHELVING STORES LIBRARIES (UPPER) & C.
518 MAIN ST. KOCH A.B. & CO. PEORIA, ILL.

CARY'S METAL STRAP

PATENTED IN ALL COUNTRIES.



SHOWING REEL HUNG UP READY FOR USE.

IN COILS.

FOR BINDING
PACKING CASES Etc.

ALSO

CARY BRAIDED WIRE STRAP

In Lengths and Coils.

BOX AND CRATE CORNERS,
PAIL COVER CLASPS,
WIRE NAILS,

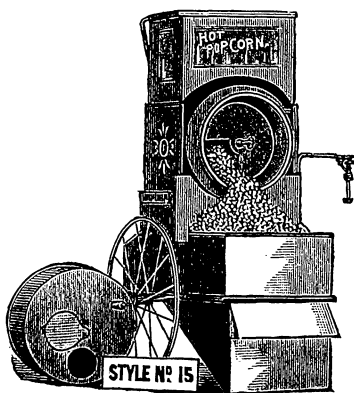
AND EVERYTHING FOR PACKERS

CARY MANUFACTURING CO

5, 7 & 9 Elm Street,

Between Reade and Duane Streets.

NEW YORK.



OLSEN'S AUTOMATIC

King of Corn Poppers, Peanut and Coffee Roasters.

The greatest wheel of fortune out, for any person 12 years and upward; \$1.00 to \$50.00 profit per day; 1500 now in use.

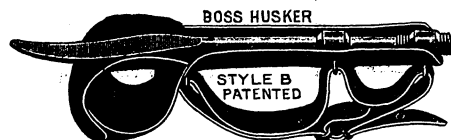
Guaranteed to have no equal. Agents wanted.

Write for illustrated catalogue and prices on Pop Corn, Shelled or on Cob, Balls, Bricks and other supplies.

A. B. OLSEN, Sole Mfr.,

218-220 E. Mo. Ave., - - Kansas City, Mo

PERKINS "BOSS" HUSKERS



and Hand Protectors.

∴ JOBBING TRADE SOLICITED. ∴

—MANUFACTURED BY—

H. H. PERKINS MFG. CO.,

96 Trade Street, Kewanee, Ill., U. S. A.

J. M. KING & CO.,

WATERFORD, N. Y.

Manufacturers of

BUTTON'S

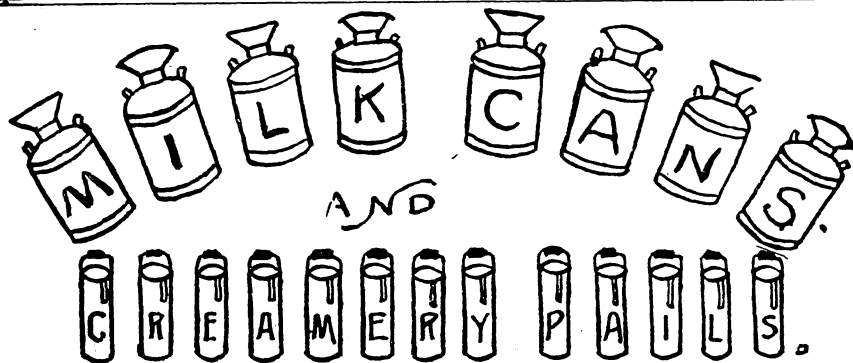
Pat. Wire Cutter
AND PLIER COMBINED.

Specially Adapted for Use on Wire Fence.

Also Manufacturers of BLACKSMITHS' and
MACHINISTS' STOCKS and DIES, PLUG and
TAPER TAPS, HAND, NUT and SCREW
TAPS, PIPE TAPS and REAMERS.

Price-List on Application.

Established by DANIEL B. KING, 1829.



MILK CANS MADE UP.

MILK CAN STOCK.

CREAMERY PAILS MADE UP.

CREAMERY PAIL TRIMMINGS.

Railroad Milk Cans, City Milk Cans,
Factory Cans.

Illustrations and Prices sent upon application.

SIDNEY SHEPARD & CO.,
BUFFALO, N. Y.C. SIDNEY SHEPARD & CO.,
CHICAGO, ILL.

Proprietors of the BUFFALO STAMPING WORKS.



WORTHLEY'S "SLOW FEED" MANGER.

"A Great Teacher." "A Good Scheme." "A New Idea."

The seven one-pint cells prevent waste and bolting. Used by Boston
Veterinary Hospital and 5000 others. 17 inch, 25 lb. size, price, \$1.60.They nest together easily. Freight Rates are extra low. Shipped from New York, New Haven
or Boston f.o.b. Discounts Liberal. Send for Catalogue of Hay Racks, Guards, &c.

WORTHLEY'S BROAD GAUGE IRON STALL WORKS, 53 Elm St., Boston, Mass.



Pat. Aug. 18, 1891.

EDGAR MFG. CO.,

Reading, Mass.

The only Good Nutmeg Grater ever made. Has
become a Staple Article in House Furnishings. On the
market but a year and selling everywhere. Ask your
jobber for it or write us for samples and prices.

Retails for 25c. and pays a good profit to the dealer.

A NEW CHAIN PUMP

KEELER'S PATENT -
Galvanized Iron Tubing
FOR CHAIN PUMP,
Is guaranteed to be
THE BEST.IT is made of best quality Gal-
vanized Iron, which will not
rust nor accumulate filth.IT only weighs one-half pound to
the foot, wet or dry, while
wood tubing saturated with
water weighs six pounds or
more per foot.IT will last longer than wood
tubing.IT will not freeze in any climate.
IT can be attached to any make
of curb.We also manufacture a Gal-
vanized (all) Iron Curb. Address

BELLEVUE PUMP CO.,

Sole Mfrs., BELLEVUE, IOWA.

OR A. F. SHAPLEIGH HDW. CO., St. Louis.
Agents for Southern Territory.

SHIPPERS

CAN SAVE TIME
TROUBLE
AND
CASHBY
USING
BARLOW'S
PATENT
MANIFOLDSHIPPING
BLANKS. SEND FORSAMPLE SHEET & PRICES
B & F. LOW BROS. GRAND RAPIDS, MICH.

Lamberson's Hardware Price Books

COPYRIGHTED 1885

LARGE SIZE FOR OFFICE USE.

6x9 1/2 Inches, 500 Pages.

Bound in Leather, Price, \$8.00.

Pocket Edition.

4x7 Inches, 250 Pages.

Bound in Leather, Price, \$4.00.

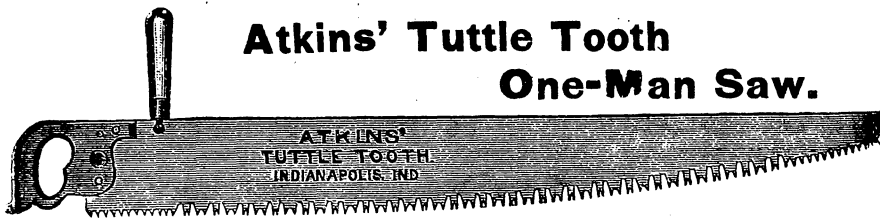
Sent, post-paid, on receipt of price by J. ...

DAVID WILLIAMS, Publisher & Bookseller,

96-102 Reade Street, New York.

E. C. ATKINS & CO., Indianapolis, Indiana.

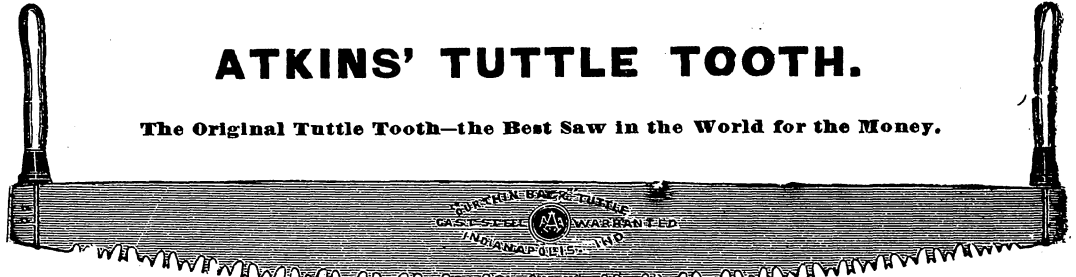
We make a Specialty of Fine High-Grade Saws.



Atkins' Tuttle Tooth One-Man Saw.

BRANCH HOUSES:

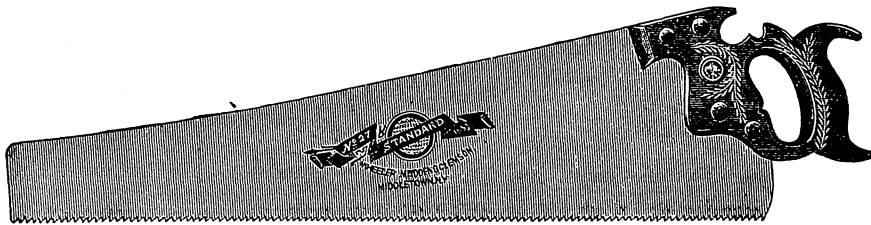
Memphis, Tenn.
Chattanooga, Tenn.
Minneapolis, Minn.



ATKINS' TUTTLE TOOTH.

The Original Tuttle Tooth—the Best Saw in the World for the Money.

THE NATIONAL SAW CO., 96 & 98 Reade St., New York.



The latest improved high class Hand Saw. It has hollow back blade, close up apple handle carved, ground thin back, patent temper and high finish, without a question the leader among first quality mechanics' saws. We warrant it fully. Packed 1-3 doz. assorted points in pasteboard boxes with telescope cover. We manufacture all styles, kinds and variety of Hand Saws, and solicit inquiries.

Three Essentials

IN THE MODERN
CROSS-CUT SAW.

- 1.—Teeth of uniform thickness.
- 2.—Five Gauges taper in middle of blade.
- 3.—Three Gauges heavier on ends than in center of back.

For 10 YEARS the Simonds Crescent-ground Cross-cut Saw (the only Saw on the market possessing these **ESSENTIALS**) has stood out prominently in contrast with all other makes of cross-cut saws. It has been the **CRESCENT-GROUND** against the **FIELD--MODERN IDEAS** against **ANCIENT METHODS**.

TO-DAY the Crescent-ground Saw is in use in every important lumber camp in the United States. Manufacturers have endeavored to imitate it, but the Machinery producing the Saw, the Process by which it is produced, and **THE SAW**, are patented. All imitations are but involuntary acknowledgments of the **SUPERIORITY** of

THE CRESCENT-GROUND CROSS-CUT SAW.

(PATENTED DEC. 26, 1882.)

SIMONDS MFG. CO.,

FITCHBURG, MASS.

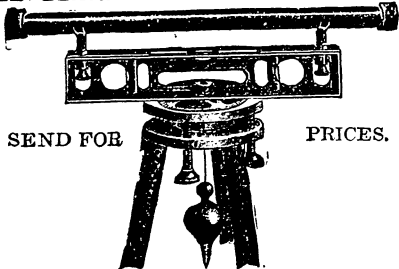
CHICAGO, ILL.

SIMONDS SAW CO.,

SAN FRANCISCO, CAL.

PORTLAND, ORE.

LEVELING & SQUARING INSTRUMENT.



SEND FOR

PRICES.

C. F. RICHARDSON & SON,
ATHOL, MASS.

Manufacturers of Iron Levels and Carpenters,
and Architects' Transits.



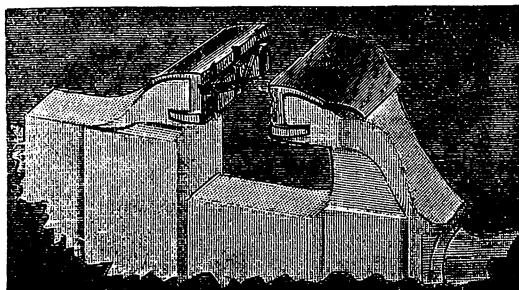
Send for
PRICE LIST

RICHARDSON BROS.

EST'D 1860.

NEWARK N.J.

INC'D 1890.



BINGHAM

PATENT VISE JAW CAP

Will Fit any Kind of Vise.

For protecting finished work. Will hold finished rods of any shape without injury.

3 1/4 inch, per pair, 40 cents.
4 " " 50 "
4 1/2 " " 60 "

PRENTISS VISE CO.

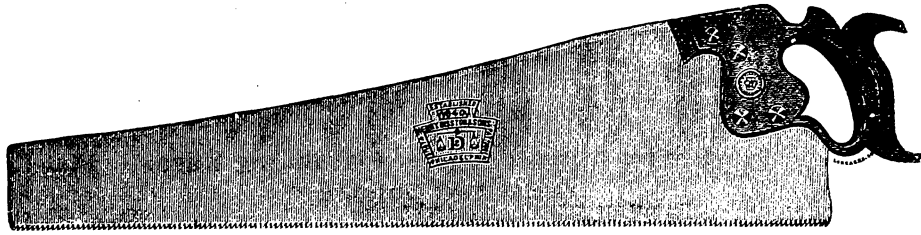
44 Barclay St., New York.

"If you want a Saw it is best to get one with a name on it which has a reputation.
A man who has made a reputation for his goods knows its value as well as its cost and will maintain it."—HENRY DISSTON.

THE SAWS THAT LEAD THEM ALL

DISSTON & SONS' PATENT D-8 HAND SAW.

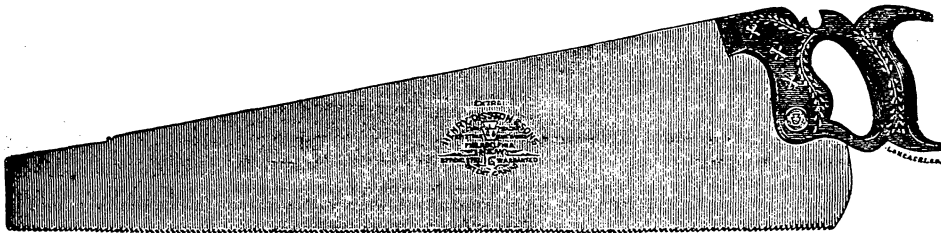
"THE
SAW;"
HOW
TO
CHOOSE
IT,
AND
HOW
TO
KEEP
IN
ORDER.
Sent
Free
on
Receipt
of
Name
and
Post Office
Address.



This Saw combines all the valuable improvements in Hand Saws that have been made by us of late. The first and most important is the hollow or skew back, the success of which can best be attested by the number sold. The peculiar shape of the butt or heel, coupled with the new method of fastening to the handle, give a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop on the proper point and a greater command over your Saw, by reason of being two inches nearer the point, which must give more power.

The Saw being let into the handle on a circle, has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

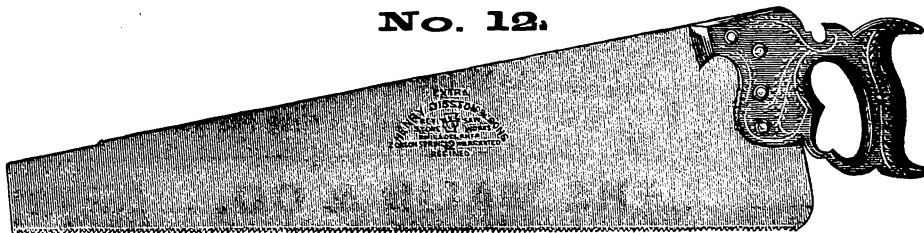
Our New No. 16 Premium Saw.



AN EXTRA FINE SAW IN EVERY RESPECT.

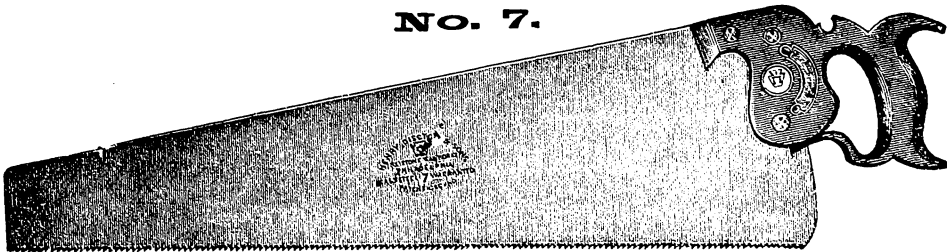
Having the Latest Close up Handle, Spring Steel Blade, Extra Thin Back, Finely Grained, with an Apple Handle and Four Brass Centennial Screws.

No. 12.



DISSTON & SONS' Extra Refined London Spring Steel, Selected and highly Polished Blade, Handle Carved and Polished, 4 Improved Brass Screws, the finest Hand Saw manufactured.

No. 7.



DISSTON & SONS' Cast-Steel, Warranted, Beech Handle, Polished Edge, 4 Improved Screws, Grained Blade.

"POCKET
EDITION
OF
THE
SAWYER"
and
"LUMBER-
MAN'S
HAND
BOOK,"
Sent
Free
on
Receipt
of
Name
and
Post Office
Address.

ASK YOUR DEALER TO ORDER THEM FOR YOU.

HENRY DISSTON & SONS

(INCORPORATED),

Keystone Saw. Tool, Steel and File Works, Philadelphia. Pa.

FACTORIES AT
AKRON, - OHIO.
CANTON, - OHIO.

The Whitman & Barnes Mfg. Co.

— MANUFACTURERS OF —

FACTORIES AT
SYRACUSE, - N. Y.
ST. CATHARINES, ONT.






Spring Keys. Spring Cotters. Flat Spring Keys. Flat Riveted Keys.

BRANCHES AT
79, 85 W. Monroe Street,
CHICAGO ILL.
1324 West 11th Street,
KANSAS CITY, MO.
126 Main Street,
CINCINNATI OHIO.

Cellar Box Cotters.

BRANCHES AT
82 So. Market Street,
BOSTON, MASS.
1917 Market Street,
PHILADELPHIA, PA.
33 Market Street,
SAN FRANCISCO, CAL.

NEW YORK OFFICE, 102 CHAMBERS ST.

NICHOLSON FILE CO.

PROVIDENCE, R. I.

3000
VARIETIES FILES
X.F.I. AND INCREMENT CUT FILES.

THE LARGEST AND MOST COMPLETE FILE WORKS IN THE WORLD.

Philadelphia, 1876.

**McCAFFREY FILE CO.,**FIFTH and BERKS STS.,
PHILADELPHIA, PA.

For Superiority



Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

BEST

CRUCIBLE
STEEL.**"TROJAN" HORSE RASPS.**

LOWEST

IN
PRICE.STRONGEST
TOOTH.

BANKER & WHITE,

TROY, N. Y.

LET
US
QUOTE.

(Troy File Works.)

THE MALIN & CO.34 and 36 Long St., Cleveland, Ohio
Manufacturers and Dealers in Steel, Copper and Brass
Wire of all kinds.**Patent Spooled Wire**

For Retail Hardware Trade and Wire Specialties.

Dealers who handle it do away with the Broken Bundle Business and sell small quantities by the spool only. It is a convenience for both dealer and consumer. It is Shellac Coated and Cannot Rust: Is wound like spool cotton on 1 oz., ¼ lb., ½ lb., 1 lb. and 5 lb. Spools.

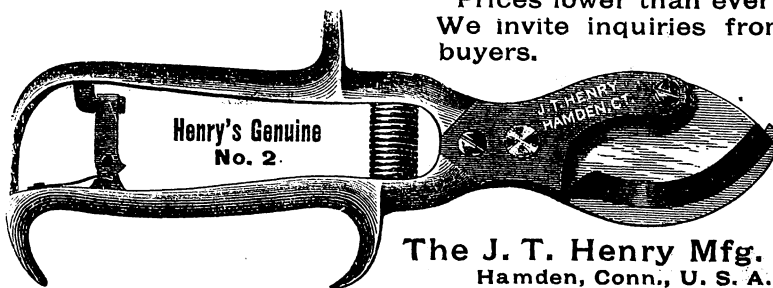
Special Wires Spooled for manufacturing purposes. Send for illustrated Catalogue and prices. Sold by all Hardware Dealers.

BOSTON OFFICE,

JOHN WALES & CO., No. 5 Winthrop Sq.



Prices lower than ever before
We invite inquiries from large
buyers.

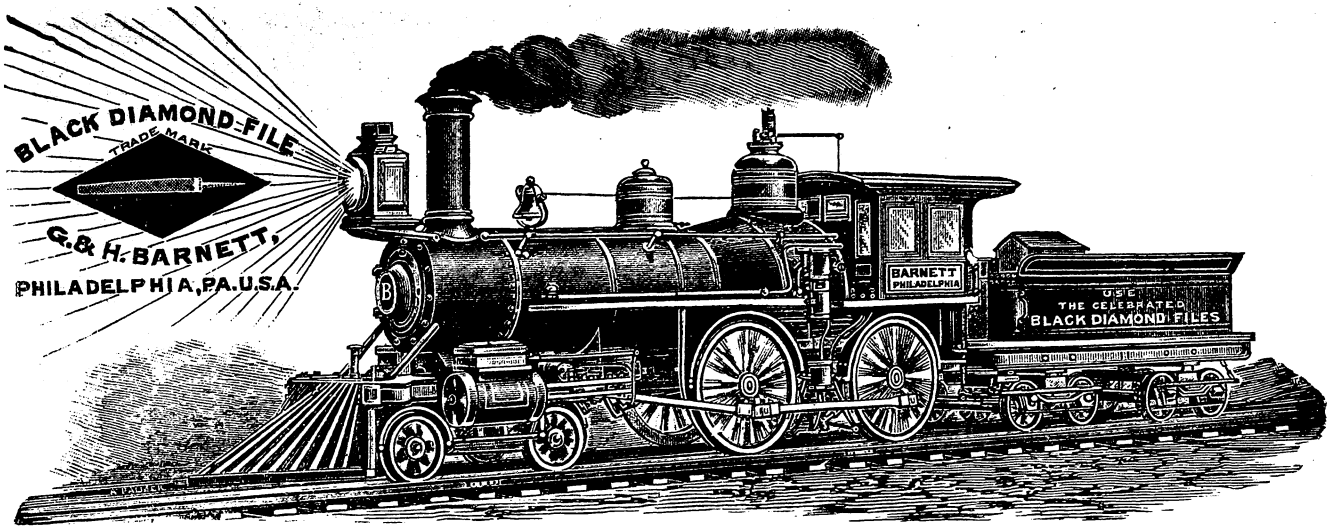


The J. T. Henry Mfg. Co.,
Hamden, Conn., U. S. A.

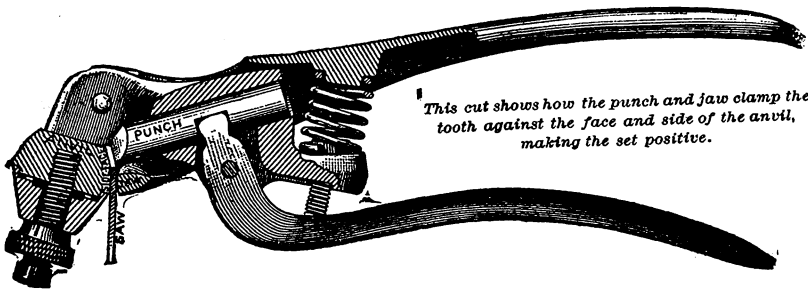


WM. KROGSrud,
Engraver and Die Sinker,
61 Fulton St., N. Y.,
Manufacturer of
STEEL STAMPS
For Every Purpose.
Steel Letters & Figures.
Burning Brands, Stencils
&c. Send for Illustrated
Catalogue.





THE TAINTOR POSITIVE SAW SET.



This cut shows how the punch and jaw clamp the tooth against the face and side of the anvil, making the set positive.

Mechanics are now inquiring for this tool, and Hardware Dealers should have them in stock, or at least have a sample.

Boston, Oct. 27, 1892.

TAINTOR MFG. CO., New York,
DEAR SIR:—Have tried your Saw Set, and find it the best in every particular and have used a great many different kinds for twenty years.

Yours, etc.,

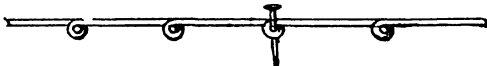
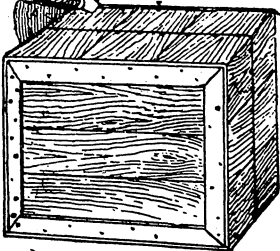
F. W. SPEARMAN, No. 75 Rutland St., Boston.

For Prices and Discounts, address

WIEBUSCH & HILGER, Ltd., Sole Agents,
84 and 86 Chambers Street, New York.

Lightning Band for Cases AND Crates.

(COVERED BY U. S. LETTERS PATENT.)



Mounted on reels and always ready for use and convenient to handle. Easily and quickly binds shipping cases and crates in a neat, strong and substantial manner.

PRICES:

No. 1, per reel of 2000 ft., \$4.50 net.

No. 2, per reel of 2000 ft., \$4.75 net.

Pliers for cutting wire, 50 cents extra.

No. 1 for cases under 300 or 400 pounds, and

No. 2 for all heavier cases.

Buffalo Specialty Mfg. Co.

Sole Manufacturers,

Buffalo, N. Y. U. S. A.

ESTABLISHED 1840.

A WORD TO THE WISE IS SUFFICIENT

When you purchase a Lantern, Street Lamp or Driving Lamp, remember the

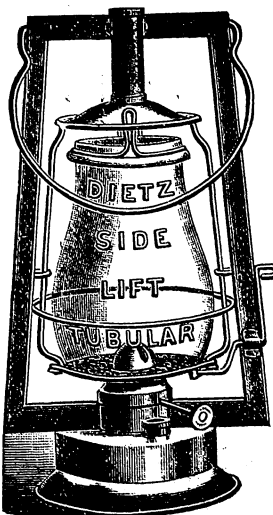
“DIETZ” Make

is the best. Our goods have stood the test of time and are safe and reliable. The name “DIETZ” is plainly stamped on them. Our specialty is Tubular Lanterns, Street Lamps and Driving Lamps. We make a large variety being the oldest and largest house in our line

ASK FOR THEM!

R. E. DIETZ COMPANY,

New York, 60 Light St. U. S. A. Chicago, 25 Lake St.



Skilled Mechanics

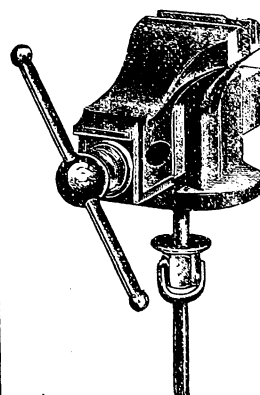
want tools that are warranted accurate, best in workmanship, latest in design, finest in finish.

Live Dealers

want tools they can swear by, not at. That can be relied upon to satisfy intelligent customers. That come nicely put up. That pay a good profit.

Starrett's Tools

meet the requirements of both.
SEND FOR CATALOGUE.
L. S. STARRETT
Athol, Mass., U. S. A.
LONDON AGTS: Chas. Churchill & Co., Ltd.,
21 Cross St., Finsbury, E. C.



HOLLANDS' OFFSET JAW VISE.

Special adapted for drill press work where chucks cannot be used and equally good for special or regular bench work.

Holland's Mfg. Co.,
ERIE, PA.,
Manufacturers of
styles VISES



John Wilson's Butchers' Knives and Steels, Skinning, Sticking, Farriers' & Shoe Knives,

Have established and maintained their reputation, for superiority,
against all Competitors, from

THE YEAR SEVENTEEN HUNDRED & FIFTY,
and are still in increasing demand. As in the past, it is the unalterable
DETERMINATION OF THE HOUSE TO SEND OUT NOTHING BUT WHAT IS OF THE HIGHEST POSSIBLE QUALITY.

WORKS: SYCAMORE STREET, SHEFFIELD, ENGLAND.

SOLE AGENTS FOR THE UNITED STATES, AND THE CANADAS.
Messrs. Hermann Boker & Co., 101 and 103 Duane St., New York.



JOSEPH RODGERS & SONS, Limited.

—MANUFACTURERS OF—

Pocket and Table Cutlery, Scissors, Razors, Erasers, &c., &c.

These goods have fully maintained their reputation as the best cutlery in the world for over

ONE HUNDRED AND FIFTY YEARS.

Any Infringements of our Name and Corporate Mark will be promptly prosecuted.

Sole Agents for the United States,

ALFRED FIELD & CO., 93 Chambers and 75 Reade Street, New York.

EVERY BLADE WARRANTED

LANDERS FRARY & CLARK,

CUTLERS TO THE AMERICAN PEOPLE.

TABLE CUTLERY OF EVERY DESCRIPTION AND OF FINEST QUALITY

FACTORIES & OFFICE—NEW BRITAIN, CONN., U.S.A.

SEND FOR CATALOGUE — WRITE FOR PRICES.

EVERY BLADE WARRANTED

Established 1836.

ALFRED FIELD & CO.

93 Chambers and 75 Reade Streets,

NEW YORK.

IMPORTERS OF

**HARDWARE CUTLERY GUNS, ANVILS
CHAINS, FILES.**

SOLE AGENTS FOR

Joseph Rodgers & Sons, Best Cutlery in the world; W. K. & C. Peace, unrivaled Grass Hooks Straw Knives and Scythes; Joseph Elliot & Sons Celebrated Razors; Peugeot Frères, "French Toilet" and other Clippers; L. Hugoniot Tissot Fine Steel Pliers, &c.; Eley Bros., Caps, Wads Cartridge Cases, &c.; Webster & Horsfall, Steel Wire of every description.

Send for Rodgers' New Illustrated Catalogue

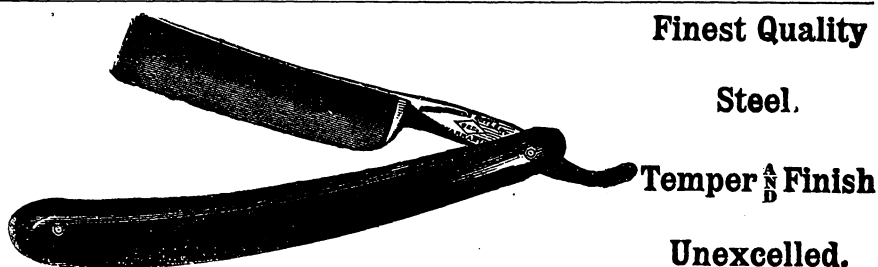
We manufacture all kinds of

EDGE TOOLS

of highest grade and sell at proper prices
Send for Illustrated Price-List.

Buffalo Edge Tool Works

308, 310 and 312 William Street,
BUFFALO, N. Y.



Finest Quality

Steel.

Temper & Finish

Unexcelled.

PRICES ATTRACTIVE. See Catalogue.

SOUTHINGTON CUTLERY CO., SOUTHINGTON, CONN.

THE FOX SAFETY RAZOR.

(U. S. Patent 484,116, October 11th, 1892.)

Is the finest and most practical in the world.

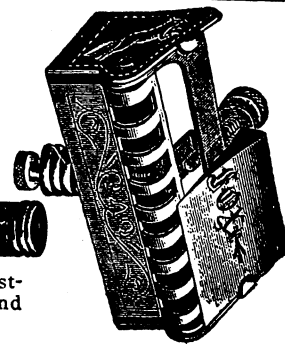
EVERY MAN HIS OWN BARBER.



Makes shaving a luxury; no danger of cutting. Adjustable blade. Silver plated frames. Sole manufacturer and patentee,

E. LOTHAR SCHMITZ, 92 Reade St., New York.

Sold by all the Leading Hardware and Cutlery Houses.



J. R. TORREY & CO., Worcester, Mass.

New York Office: 85 Chambers Street.



No. 8 X.

The TORREY RAZOR STROPS are known the world over as the standard for excellence in setting a fine edge. We manufacture and carry in stock more than 150 styles.

—Send for Illustrated Catalogue.—

BUCK BROTHERS' EXTRA**BUCK BROTHERS,**

MILLBURY, MASS.

The Most Complete Assortment in the U. S. of

Shank, Socket Firmer and Socket Framing Chisels.

PLANE IRONS.

TRADE MARK

CAUTION.—Buyers should be on their guard and not have inferior goods palmed on them by unprincipled persons who represent them as our make. Our tools are stamped "BUCK BROTHERS," and our labels have on our trade-mark also, "Riverlin Works."

Established 1825.

Incorporated 1892.

R. HEINISCH'S SONS CO.,

NEWARK, N. J., U. S. A.

New York office, No. 90 Chambers St.

Tailors' Shears, Trimmers, Scissors, Tinnerns' Snips, etc.

CATALOGUES AND PRICES ON APPLICATION.

WE HAVE NO CONTRACT WITH MESSRS. HERMANN BOKER & CO. AS AGENTS FOR THE SALE OF OUR GOODS.

HIGHEST AWARD PARIS EXPOSITION, 1889.



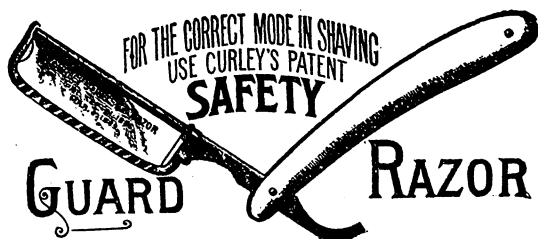
THE L. & I. J. WHITE CO.,

BUFFALO, N. Y.

MANUFACTURERS OF

EDGE TOOLS.

Coopers', Carpenters' and Ship Tools, Plane Irons, Cleavers, &c. Full Line Chisels.



FOR THE CORRECT MODE IN SHAVING
USE CURLEY'S PATENT
SAFETY

GUARD**SAFETY RAZOR**

THIS improvement permits CORRECT SHAVING, therefore no irritation is caused, and the most inexperienced can shave with perfect safety.

We also carry the largest line in the United States of CUTLERY of every description.

J. CURLEY & BROTHER,

6 WARREN STREET, - - NEW YORK.

Cast Shears.

ACME SHEAR CO.,

BRIDGEPORT, - CONN.

**MARTEN DOSCHER,
Commission Hardware.**

88 Chambers St., New York.

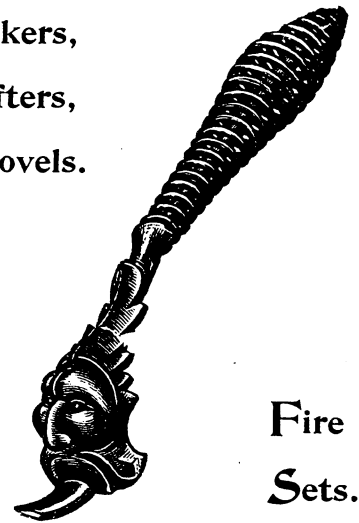
Agent—G. W. Bradley's Edge Tools, Axes, Coopers' Tools, Cleavers, Bush Hooks, Draw Knives, Ship-Carpenters' Tools, &c. Also a full stock of Planes, Brooks' Bright Wire Goods, Washita Stone and Taunton Tack Co.'s Rivets, &c.

ALASKA.

ALWAYS COLD.

Stove Trimmings.

Pokers,
Lifters,
Shovels.



Fire
Sets.

For Sale by All

First-class Jobbers in Hardware.

Made under Gaitly Patents and only by

Troy Nickel Works,

TROY, N. Y.

FRANCIS FROST & CO., Toronto, Ont.
Canadian Sales Agents.

WHEN IN WANT OF
WOSTENHOLM'S
I★XL

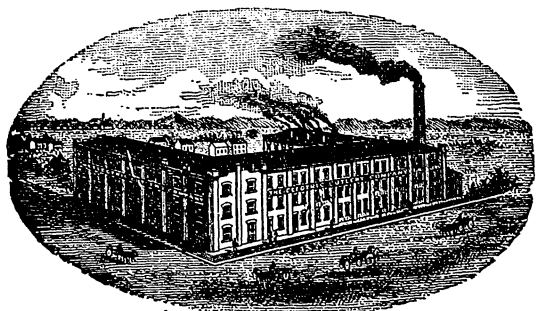
**Knives or Razors,**

SEND TO

FRED. B. GURNEY.

116 Chambers St., N. Y.

The Best Equipped Cutlery Works in the World.



FACTORY: FOURTH & DICKERSON STS. NEWARK, N. J.

THE ELECTRIC CUTLERY CO.,

113 Chambers St., N. Y., and Newark, N. J

Manufacturers of Razors, Knives,
Razor Stropps, Scissors and Shears.

(SEND FOR CATALOGUES.)

NORTHAMPTON CUTLERY CO.,

NORTHAMPTON, MASS., and 122 CHAMBERS ST., NEW YORK.

WE CALL ESPECIAL ATTENTION TO OUR COMPLETE LINE OF FINE GOODS IN RUBBER,
CELLULOID, BONE, IVORY, &c.

— OUR CLAIMS ARE: —

EXTRA QUALITY OF STEEL IN BLADES.

SUPERIORITY IN GRINDING AND FINISH.

STRENGTH AND DURABILITY.

Made in Plain Steel or Heavily Plated Blades, Hand Burnished.

W. & S. BUTCHER, Sheffield, England, and 135 Duane St., New York,
Makers for over *One Hundred Years* of the celebrated "*W. Butcher*" Files and
Edge Tools and "*Wade & Butcher*" Razors, and the Original Manufacturers of Hollow
Ground Razors, can with confidence highly recommend their goods and particularly their

WADE & BUTCHER
SHEFFIELD, ENGLAND

OR



OR

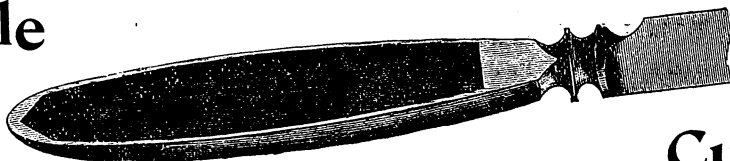


FOR SALE BY ALL DEALERS IN HARDWARE, CUTLERY AND FANCY GOODS.

Brand as being the most perfect *Extra Hollow Ground*
Razors ever manufactured and especially suited for the use of
Barbers and for private use. Genuine Razors are marked with
one of the following Corporate Trade-Marks:

Hollow Handle

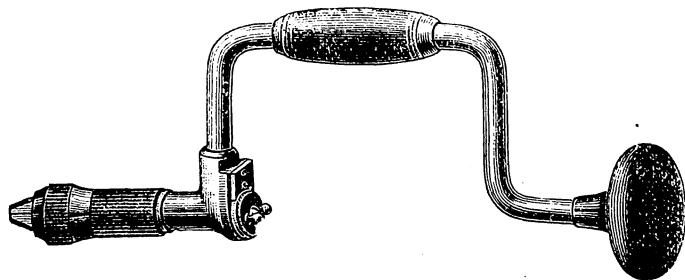
Its Lightness commends it.
Its Plating guaranteed Silver.
Its Style of Form is Superior.
Its Price, that's what sells it,
WRITE FOR PARTICULARS.



THE CHAPIN
CUTLERY CO.,
TOLEDO, O.,
M'F'RS.

Cutlery.

Standard Bit Brace Ratchet.



Patented.

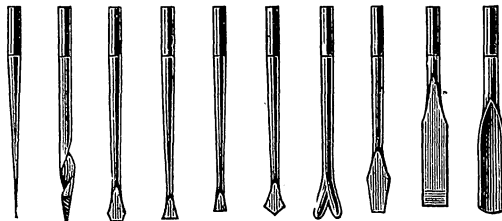
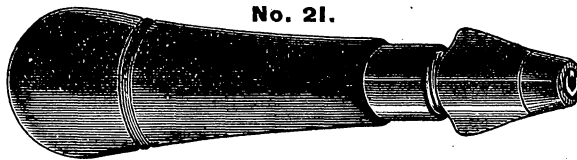
Standard Screw Driver.



Patented March 25th, 1890.

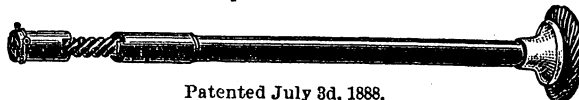
Standard Tool Handle.

No. 21.



Patent Applied for.

Standard Spiral Screw Driver.



Patented July 3d, 1888.

CHANTRELL TOOL CO., Manufacturers,

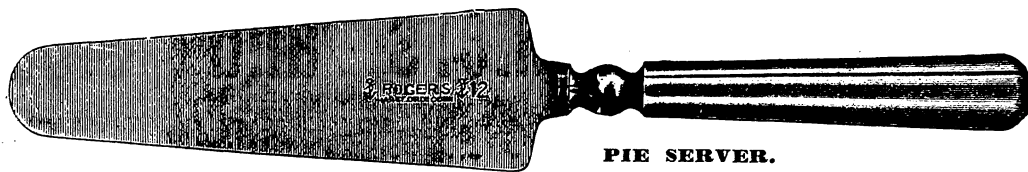
- - - READING, PA.

—NONE BETTER—

THAN THE



SILVER PLATED WARE.



PIE SERVER.

MANUFACTURED BY

THE Wm. ROGERS MFG Co.,

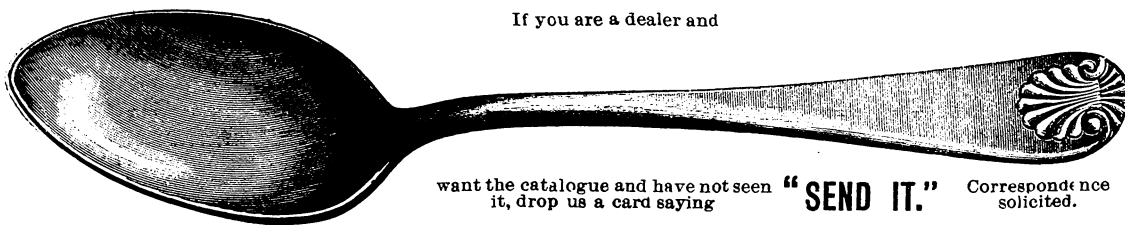
Office and Factory, HARTFORD, CONN. P. O. Drawer 30.

NEW CATALOGUE FOR THE ASKING.

WHY DID YOU SEND FOR IT?

That new catalogue with illustrations of our Silver Plated Flat Ware. Was it of service to you? Did you order a line of our spoons and forks in consequence? WHY NOT?

If you are a dealer and



want the catalogue and have not seen it, drop us a card saying "SEND IT." Correspondence solicited.

THE HOLMES & EDWARDS SILVER CO., - Bridgeport, Conn.

IF YOU WANT THE BEST
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.



COOK'S PATENT LEVEL.

Made in Wood and Iron. Every Level Fully Guaranteed.

Inquire at your nearest hardware store
for them. If not in stock, send to

TAKE NO OTHER.

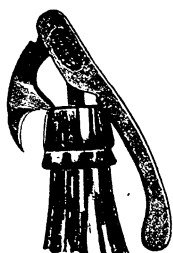
DAVIS & COOK,
WATERTOWN, N. Y.

Fig. 3. Showing cork, screw and fulcrum in position to pull cork.

Detroit Cork-Screw Co., Detroit, Mich., U. S. A.

Manufacturers of

The Davis Cork-Screw,
The Davis Knife and Cork-Screw,
The Puddefoot Cork-Screw,
Columbus and Greeley
Cork Extractors.

Manufacturers of

Cut Worm
Spiral Screws and
Cork-Screw Novelties.
Cut Worm Cork-Screws
for the Bar Cork Puller.

Send for Price-List and Discounts.

GENUINE **MARTY** RAT AND
ALWAYS IN STOCK. MOUSE
TRAPS



THEY DO THE WORK.
Orders solicited. Prices on application.
BURDITT & WILLIAMS,
20 Dock Square, Boston, Mass.
-- SOLE AGENTS AND IMPORTERS. --

SELLS AT SIGHT.



Wanted by
Every Housekeeper.
Cottner's Pat. Dipper and Cup Handle.

Is the handiest thing out. With it a dipper can be made of a common glass, a tea cup, or a granite ware cup. The glass or cup can be securely attached to the handle or removed in a moment. The handle is very durable, and so cheap that they will sell at sight. For sale by all jobbers. Price \$7.20 per gross. If your jobber cannot supply you, send orders direct to
HOME NOVELTY MFG. CO., - - - St. Louis, Mo.
Hatch Cutlery Co., 97 Chambers St., New York, Eastern Agts.

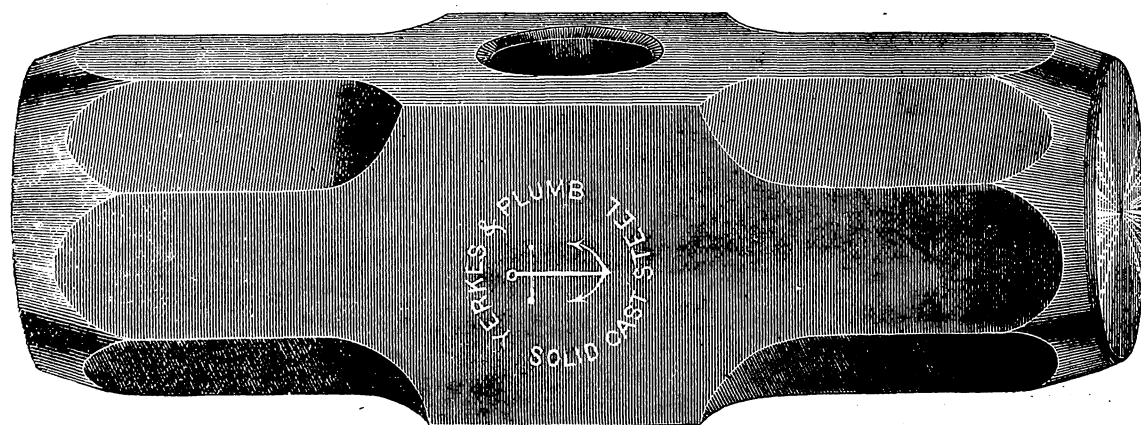
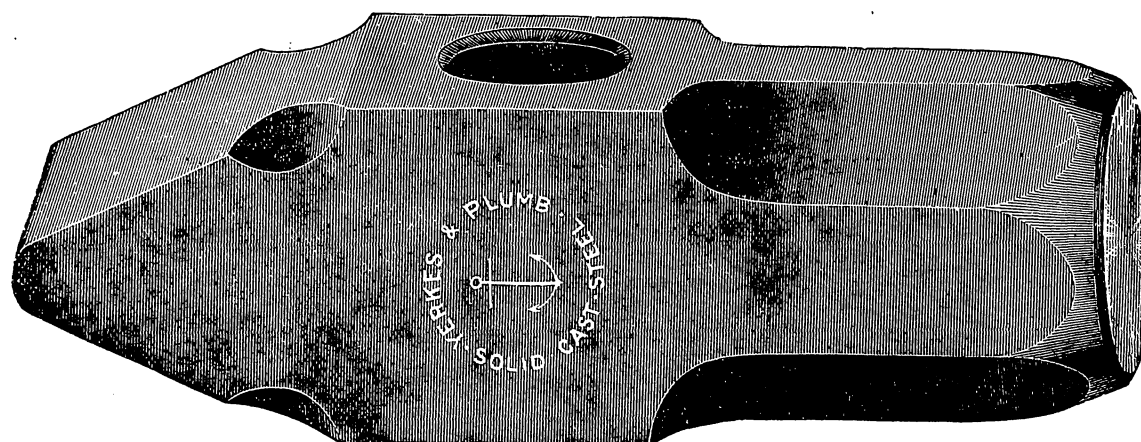
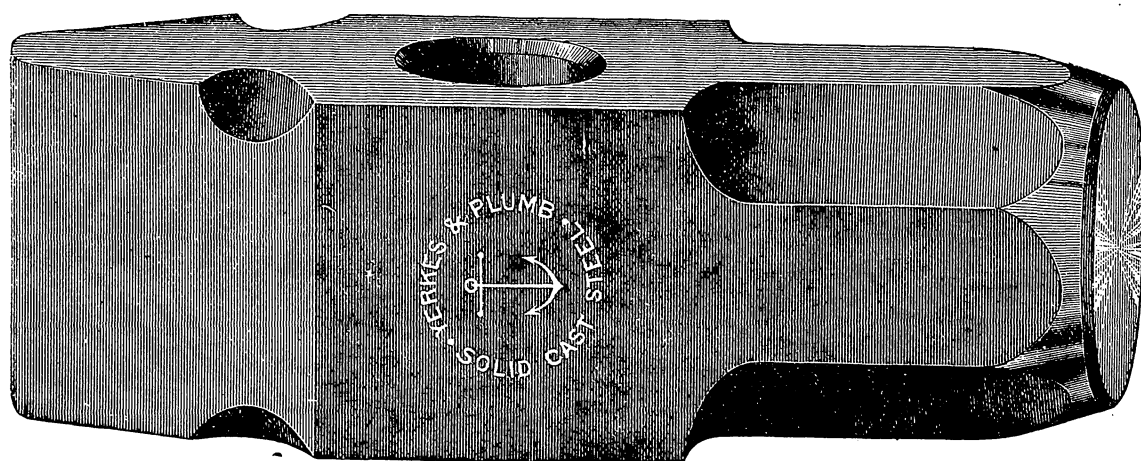
Fayette R. Plumb,

MANUFACTURER OF

Edge Tools, Hammers and Sledges,

Railroad, Miners' and Blacksmiths' Tools.

PICKS, MATTOCKS and GRUB HOES.



PHILADELPHIA, PA., U. S. A.

THE AMERICAN AXE AND TOOL CO.,

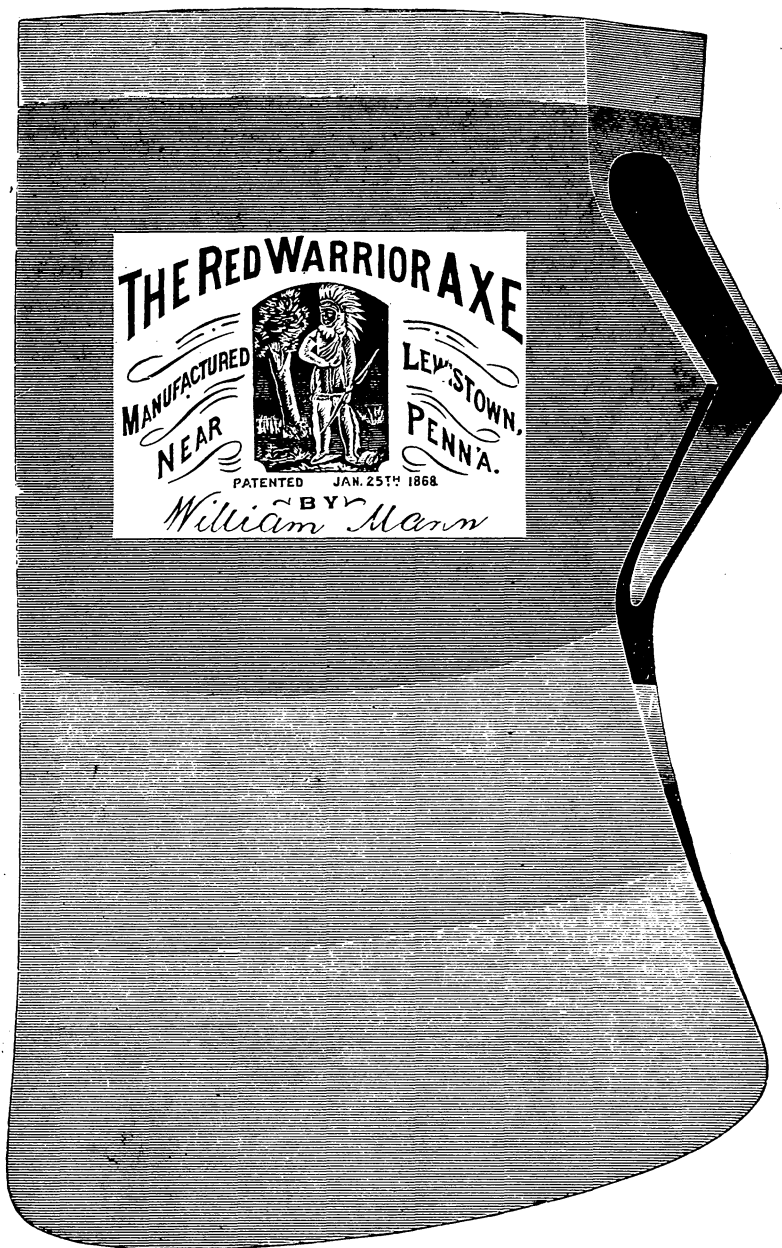
STEWART BUILDING, Rooms 63 to 67,
280 Broadway, - - - **NEW YORK.**

Manufacturers of

BLOOD HUNT LIPPINCOTT, RED WARRIOR, MANN, HURD, PEERLESS, JAMESTOWN,
ROMER, FRANCIS, SHARPS, UNDERHILL, STEWART,

Brands of

AXES, HATCHETS, BROAD AXES and ADZES, also "Blood's" Champion and
"Hubbard's" Diamond Blade SCYTHES.



Grass Hooks, Corn Knives, Bush Hooks, Planters' Eye Hoes, Ice Axes, Ice Hatchets and
Firemen's Axes, Wood Chisels, Picks, Mattocks, Brick Hammers, Box Openers, Ice Chisels, Butchers'
Handled Axes, Meat Hatchets.

ALWAYS IN STOCK: Best Leading Brands of Axes and Edge Tools. Cheap Handled
Axes, Medium Grade Axes. Boys' and Hunters' Axes. **Job Lots of Axes, all Grades
and Patterns.**

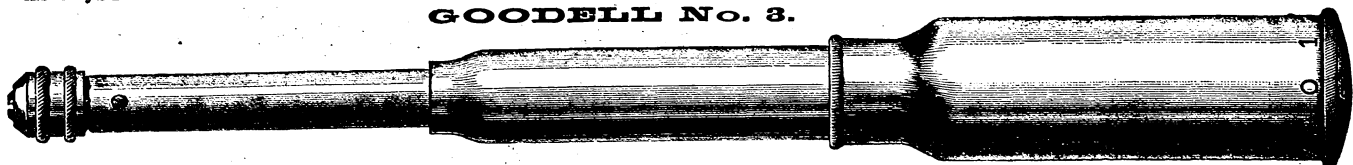
ADDRESS ALL CORRESPONDENCE TO NEW YORK OFFICE.

DRILL POINTS
Always in the Handle.

THE BEST AUTOMATIC DRILL IN THE WORLD.

**SEND
FOR CIRCULAR.**

GOODELL No. 3.

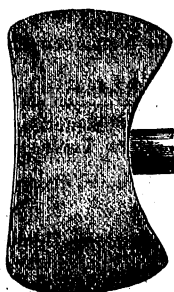


H. H. MAYHEW CO.,

SHELburne FALLS, MASS., U. S. A.

Manufacturers of Fine Mechanics' Tools.

NEW YORK AGENTS: C. E. JENNINGS & CO, 79 READE ST.



HIGH GRADE AXES AND TOOLS.

DOUBLE BIT AXES. CARPENTERS' ADZES,
SINGLE BIT AXES. MINING PICKS,
BROAD-AXES. MACHINE KNIVES,
HAND-AXES. BARK SPUDS.

We make all patterns and styles of Axes, including PEELING
AXES, RAFTING AXES, BOYS' AXES, Etc., Etc. Our "BLACK
EAGLE" AXE is made by a Chemical Process, known only to
us, and never fails in frozen or knotty timber.

STANDARD AXE & TOOL WORKS,
RIDGWAY, PA., U. S. A.

Pumps and Pumping Machinery. Part I. By
FREDERICK COLVER, M. Institute C. E. Second edition, revised and enlarged. Synopsis of contents:
Lift Pumps.—Driving gear. Beer, tar, vinegar,
sewage and well pumps, &c. Force pumps, various kinds. General details of lift and force
pumps. Arrangement of engines and pumps. Depth
of suction, water towers, &c. Sundry pumps.—
Centrifugal, drainage and dock pumps, chain
pumps, air pumps, blowing engines and compressors. Engines for working pumps. Horizontal high-
pressure engines. Compound engines. Vertical
engines. Quadruple-expansion engines. Data of
working results, &c., &c. Cornish engines. Beam
and bull engines. Fuel consumed. Boilers, vertical,
cylindrical, Cornish, Lancashire, multitubular,
patent water tube boilers, &c. Engine houses, details
of construction, fittings for rooms, &c. Boiler
houses. Index. 200 pages. 53 large folding plates
to scale. Cloth, 8vo\$10.00

For Sale by David Williams 36-102 Reade St., New York

It is Steel

THAT
CHRISTY
EDGE
CUTS.

FINEST STEEL

THE WONDERFUL CHRISTY BREAD KNIFE

THAT
EDGE
CUTS

NOT (A) STEAL.

REPUTABLE DEALERS WILL NOT IMPOSE UPON THEIR PATRONS KNOWINGLY. THERE ARE IMITATIONS OF THE "CHR-STY," CHEAP! BUT—NOT GOOD.
THE "CHRISTY" IS THE ONLY KNIFE OF ITS KIND THAT WILL CUT BREAD, CAKE, MEAT, ETC., WITHOUT CRUMBLING, DRAGGING OR TEARING, AND THAT RETAINS ITS CUTTING EDGE. WRITE

The Christy Knife Co., Fremont, O.

THE
BEST LIQUID GLUE.

Stronger
than
FISH
GLUE

Leggett's White Glue

Sweeter
than
FISH
GLUE

10¢
&
15¢
BOTTLES

1 PINT
QUART
GAL.

FOR WOODWORK
CROCKERY & GLASS
RELINING ON TIN
GLASS &c.

STRONGEST
AND BEST OF ALL
LIQUID GLUES

GLUE GLUE GLUE

LEGGETT'S
LIQUID WHITE GLUE.

It has many advantages over other liquid glues. Always ready for use, may be thinned with water without injury, will keep in any climate, never spoils and has no unpleasant odor; it does not thicken in cold or become thin in warm weather and is not affected by changes in the atmosphere. Articles mended will not fall apart in damp weather, as is often the case when fish glue is used. It is particularly adapted for wood work, carriages, emery wheels, belting, &c. Will mend crockery and glass. May be used for labeling on tin or glass by slightly thinning with water. It does not wrinkle paper and is superior to mucilage for pasting bills, scraps, &c., in books. The corks with brush attached are prepared so they will not stick to the glass or tin, making package easy to open and close and more convenient than the ordinary can or bottle in use. 1 and 2 oz. bottles, 4 oz., ½ pint and pint cans have brush attached. Quart, ½ gal. and gal. cans with patent double covers. Wire stand furnished.

LEGGETT & BRO., 301 Pearl St. N. Y.

READY FOR USE

LEGGETT'S WHITE GLUE

FOR WOODWORK
CROCKERY & GLASS
PATENTED FOR U.S.

PAT. APPLIED FOR

Edward S. Hotchkiss,
MANUFACTURER OF HARDWARE,
BRIDGEPORT, CONN.

"NUTMEG STATE."

SATISFACTORY PRICES. Standard goods. Don't fail to write when in want of Horse and Barber's Clippers, No. 20 Steel Rat Killers, Curry Combs, Metal and Wood Choker Mouse Traps, Lemon Squeezers, Baxter Pattern Wrenches, &c., &c.

N. Y. MALLET AND HANDLE WORKS.
MANUFACTURERS OF
MALLET'S.
Also Cotton and Bale Hooks.
Patented Feb. 13, 1877, a new combination of Hooks.
456 E. HOUTON ST.,
New York City.

GASOLINE & OIL
TORCHES.

TINNERS' & PLUMBERS
FURNACES.

PAINT
BURNERS.

THE DANTLER STOVE & MFG. CO., CLEVELAND, O.

SNELL MANUFACTURING CO., 72 Reade St., New York,
MANUFACTURERS OF
Ship Augers, Auger Bits, Boring Machines and Boring Implements.
ESTABLISHED 1790.

FIRST PREMIUM AWARDS: Mass., 1841, 1848, 1850; International Ex., Paris, 1878; Centennial Ex., Phila., 1876

Manufacturers of Car Bits, Jennings' Pattern Auger Bits, Boring Machine Augers, Carpenters' Augers, Mill Augers, Rafting Augers. Gimlets and Gimlet Bits, and Screw-Drive Bits.
All Kinds of Machine Bits Made to Order.
All Goods made of the Best Quality of Cast Steel and Warranted. First Premium Medals taken for Superior Quality and Excellence of Finish.

Factory, - - - Fiskdale, Mass.

HARDWARE SPECIALTIES.

Box Scrapers, Bark Spuds, Standard Floats, Horse Tooth Rasps, Tanners' and Carriers' Tools.

Exclusive Manufacturers of the

UNION FLEASHER

Also Makers of

Small Steel Springs of every description. MARK Plain, Stamped and Japanned Tinware.
STAMPING AND JAPANING A SPECIALTY.

GEO. D. ELLIS & SONS CO., 229 and 231 Vine St., Philadelphia.
Catalogue and Price-List or Quotations sent on application

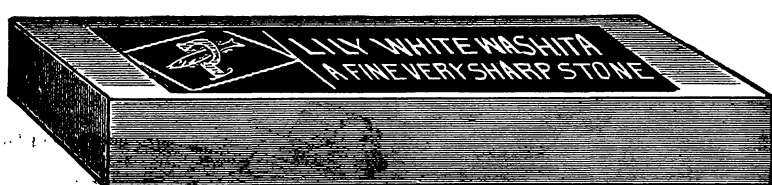
Hosted by Google

CONDEMNATION FOLLOWS FAILURE.

Failure to get a good cutting edge on to a tool may lead to the condemning of the tool when the *real fault* is with the *Sharpening Stone* used.

Is it Economy then to buy a Whetstone whose only merit is its Cheapness?

PIKE'S LILY WHITE



is the **OILSTONE** all
*first-class tool dealers recommend. It will impart
a good cutting edge every time.*

WE GUARANTEE IT

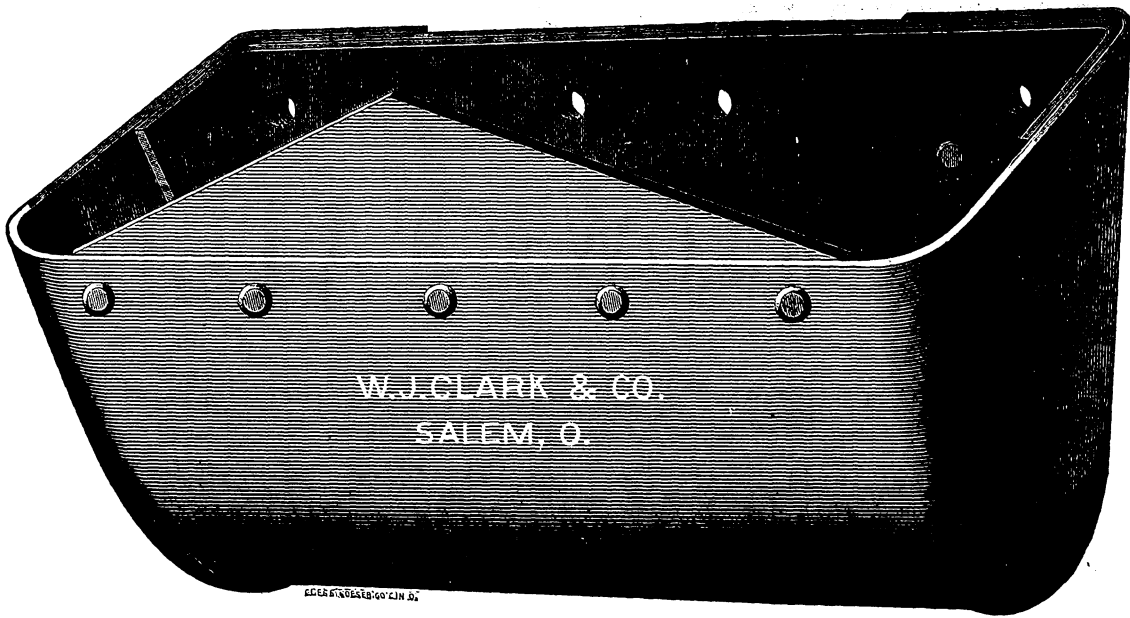
for sharpening scythes or similar harvesting tools.
*Pike's Indian Pond, Black Diamond, Lamoille or
Sun Scythe-stones* are the most reliable and satis-
factory.

ILLUSTRATED CATALOGUE UPON APPLICATION.

THE PIKE MANUFACTURING CO.,

PIKE STATION, N. H.

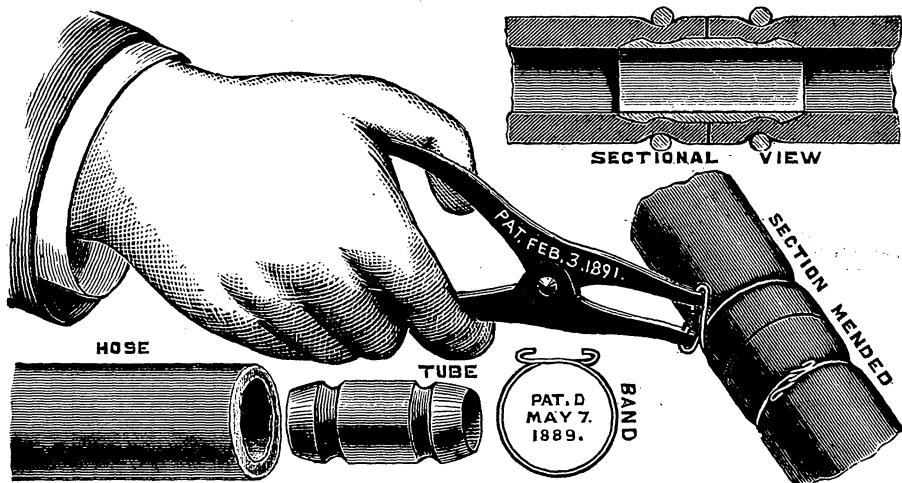
Milling, Mining, and Grain Elevating Buckets always in stock. Any size.



Elevating and Conveying Apparatus a Specialty.

Extra heavy "SALEM", elevator buckets with DIGGERS to enable them to load themselves when used for loading cars with dirt, sand, gravel, &c. We make them of any size and of any Strength required.
W. J. CLARK & CO., General Sheet and Plate Metal Workers, SALEM, OHIO, U. S. A.
Send specifications for estimates on any special work wanted.

HUDSON'S GARDEN HOSE MENDER.



Put up in Boxes for Family Use.

Each Box Contains 1 Pair Pliers, 6 Tubes, 20 Bands.

Hose can be mended or Couplings fastened on

**CHEAPER,
QUICKER and
MORE SECURELY**

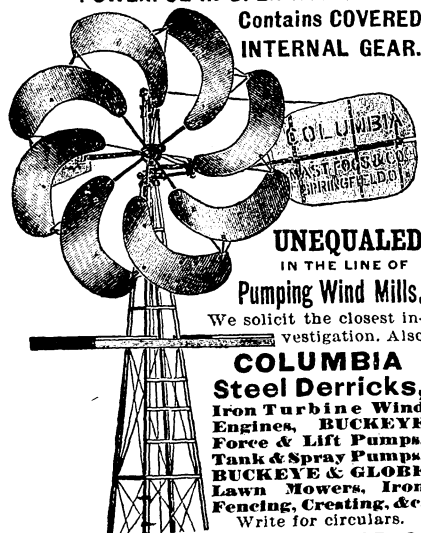
than with any other device.

Screw menders tear the rubber lining from the hose. OURS will not. If you wish to handle a good thing with a good profit, write for circular and prices.

C. E. HUDSON & CO.,
LEOMINSTER, - - - MASS.

COLUMBIA STEEL Wind Mill

New in Principle. Beautiful in Appearance. POWERFUL IN OPERATION.



Contains COVERED INTERNAL GEAR.

UNEQUALED IN THE LINE OF

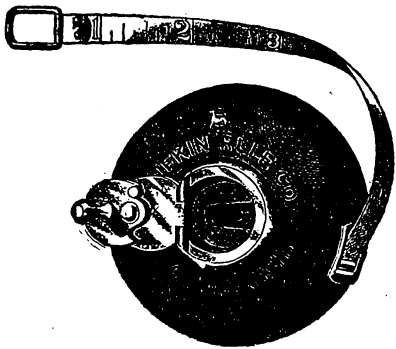
Pumping Wind Mills.

We solicit the closest investigation. Also

COLUMBIA
Steel Derricks,
Iron Turbine Wind
Engines, BUCKEYE
Force & Lift Pumps,
Tank & Spray Pumps,
BUCKEYE & GLOBE
Lawn Mowers, Iron
Fencing, Creating, &c.
Write for circulars.

MAST, FOOS & CO., SPRINGFIELD, O.

"RELIABLE" Steel Measuring Tapes.



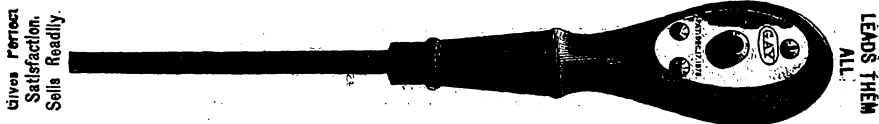
Entirely new. Handle or crank when closed is perfectly flush with leather case. Opens by pressing button on opposite side and folds out double, giving increased leverage. Best and most convenient steel tape on the market. Fully guaranteed. Will send samples on approval.

LUFKIN RULE CO., Saginaw, Mich.

THIS IS THE "OLD RELIABLE" DOUBLE ACTION RATCHET SCREW DRIVER

One of the Very Best Tools Ever Invented.

It Combines greater Strength, Convenience and Durability than was ever obtained in a Common Driver



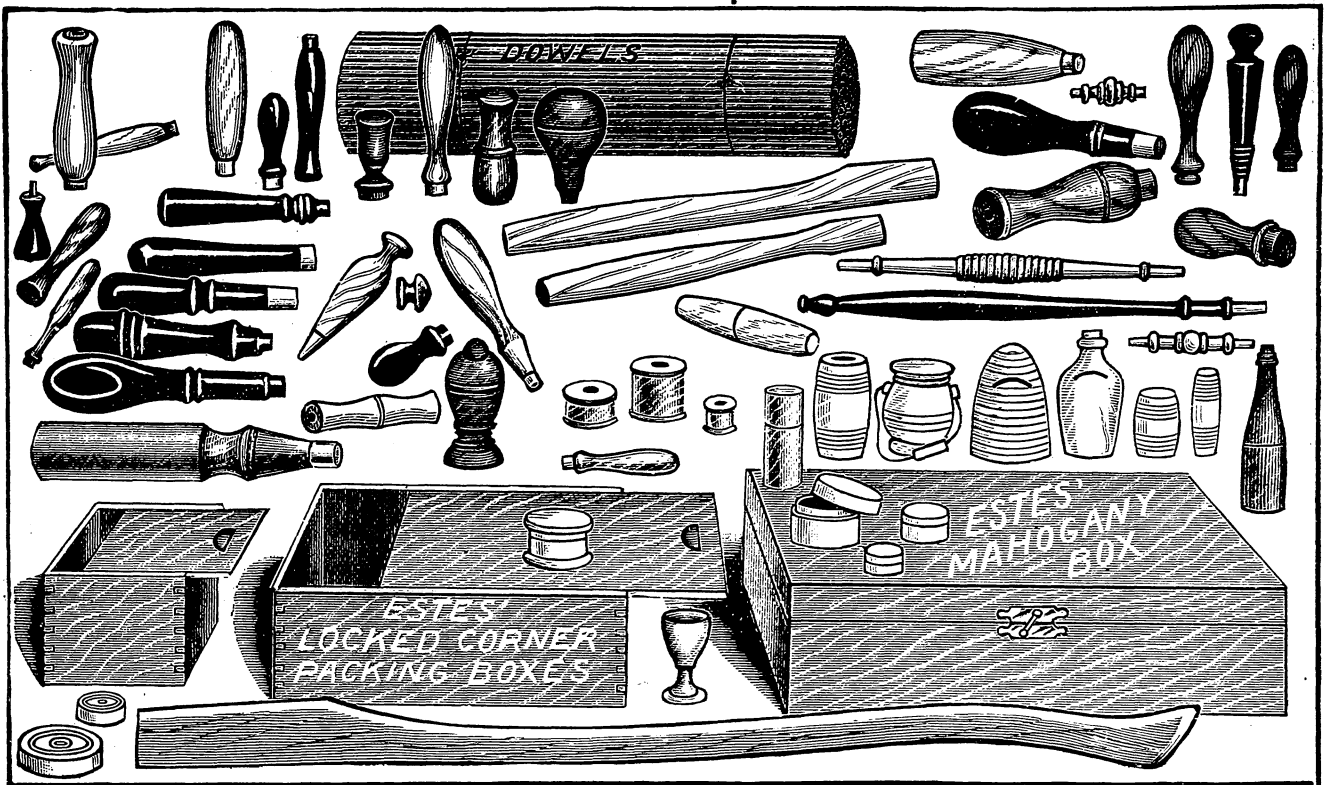
Sold by all First-Class Dealers. Send for Price List.
Manufactured by **CAY & PARSONS,** Augusta, Maine, U. S. A.
JOHN H. GRAHAM & CO., Agents, 118 Chambers Street New York.

E. B. ESTES & SONS (Eastern Box and Handle Manufacturers)

MANUFACTURERS OF

HANDLES

LOCKED CORNER PACKING BOXES, Turned Wooden Boxes, Fancy Boxes, Dowels, Spindles, Wooden Toys and all kinds of Square and Round Wood Work.

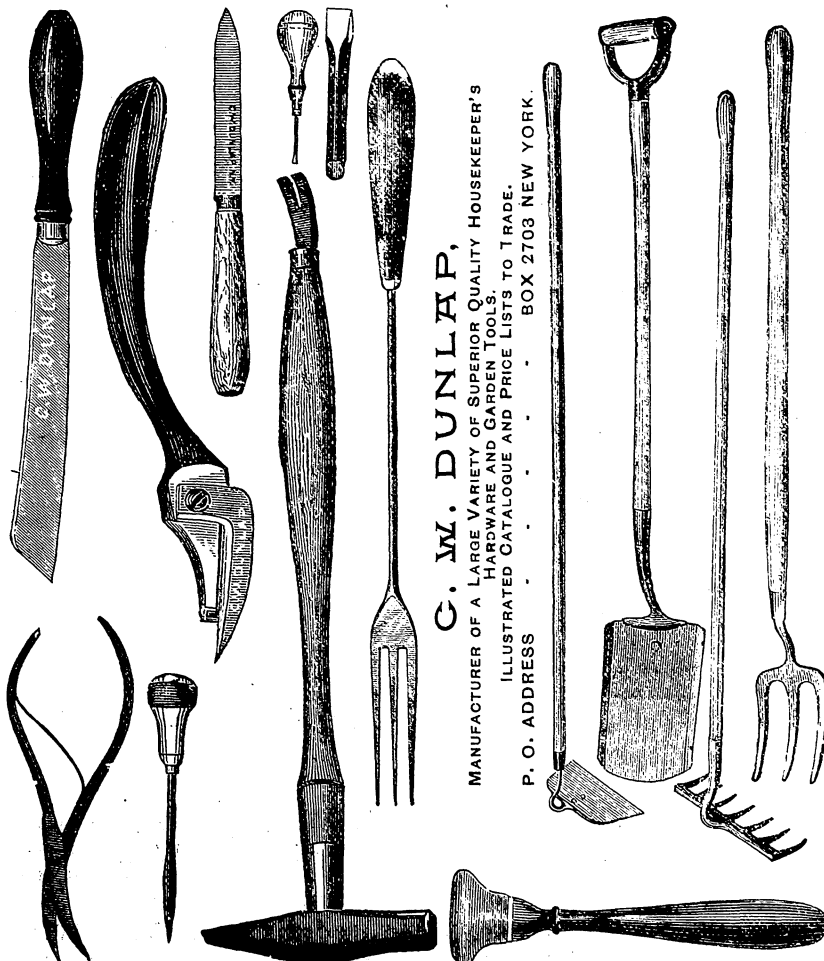


We are the most extensive manufacturers of Handles and Wooden Boxes in this country, and will make you lower prices than you can obtain elsewhere. Send for quotations

E. B. ESTES & SONS, Eastern Woodworkers.

OFFICE, SALES AND STORE ROOMS, 254 Pearl Street,

WAREHOUSE, 4 Fletcher Street, NEW YORK.



C. W. DUNLAP,

MANUFACTURER OF A LARGE VARIETY OF SUPERIOR QUALITY HOUSEKEEPER'S

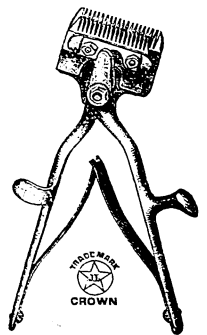
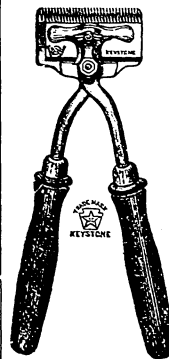
HARDWARE AND GARDEN TOOLS.

ILLUSTRATED CATALOGUE AND PRICE LISTS TO TRADE.

BOX 2703 NEW YORK.

P. O. ADDRESS

IF YOU ARE INTERESTED IN CLIPPERS

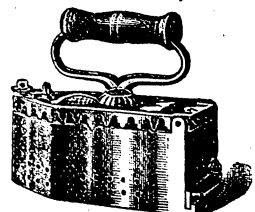


For HORSEMEN OR BARBERS

Send Postal Card for our new Illustrated Catalogue.

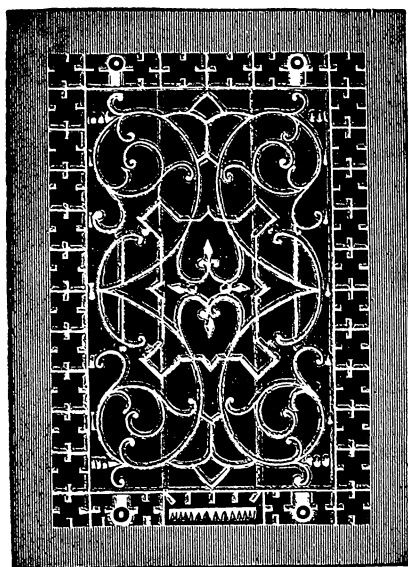
JESSE LEE & SON,
37 SO. FOURTH ST., PHILADELPHIA.

**THE
UNIVERSAL SAD IRON CO.**
MILWAUKEE, WIS.,



Manufacturers of the Best Charcoal "Sad Iron" in the world for Families, Dress and Cloak Makers and Tailors. Send for Circulars and Sample Irons. Agents wanted everywhere

REGISTERS.



Catalogue and Prices on Application.

Cleveland Foundry Co.,
CLEVELAND, OHIO.

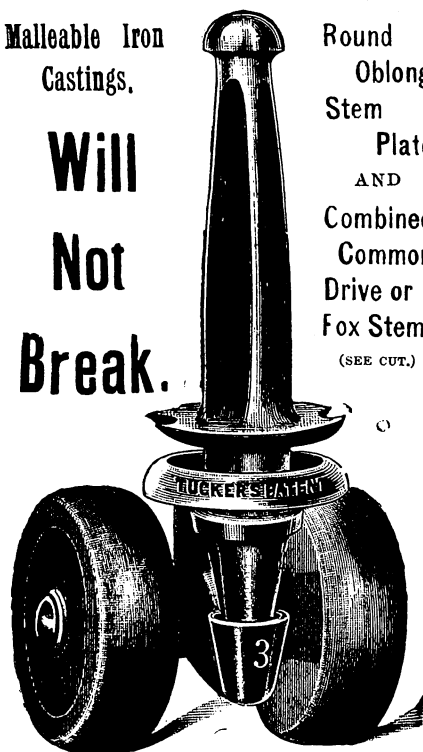
Eastern Office, 82 North St.,
BOSTON, MASS.

TUCKER'S PATENT FURNITURE CASTER.

Malleable Iron
Castings.

**Will
Not
Break.**

Round
Oblong
Stem
Plate
AND
Combined
Common
Drive or
Fox Stem.
(SEE CUT.)



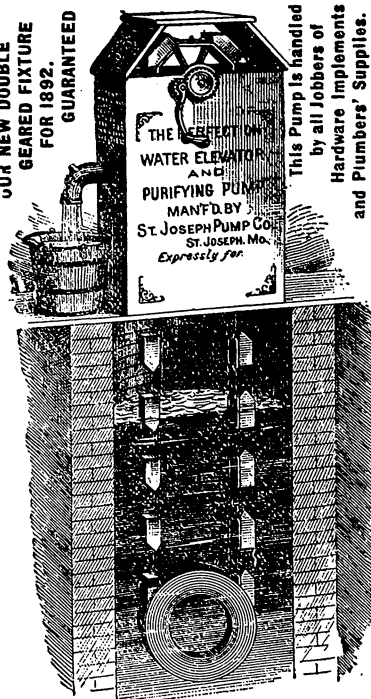
The most satisfactory Anti-Friction
Caster in the market.

—ASK FOR—

Catalogue, Discount and Sample.

Tucker & Dorsey Mfg. Co.
INDIANAPOLIS.

3/4 NEW DOUBLE
GEARED FIXTURE
FOR 1892.
GUARANTEED



This Pump is handled
by all Jobbers of
Hardware Implements
and Plumbers' Supplies.

The First 1/4

of this year was a busy period with us. We have added a number of new customers to our lists, but want more. We want you. Send for catalogue and prices.

A dealer wanted in every town. Be sure you get "The Perfection." Take no other. For full information, catalogues, etc., address the manufacturers, mentioning this paper.

ST. JOSEPH PUMP CO.,

ST. JOSEPH, MO., U. S. A.

E. A. KING, Sec'y and Gen'l Manager.

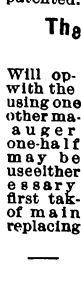
THE BUCKEYE MFC. CO., UNION CITY, INDIANA.

The Gem Post Hole Digger.

This AUGER bores rapidly and is easily operated. It will open wide when dumping the dirt, which may be entirely removed from the hole—whether wet or dry, fine or coarse—by closing the blades.

The GEM is the only post hole auger having blades so shaped as to allow them to close in a perfect manner at points, and sufficiently to retain the dryest and even the finest dirt or sand. This great improvement and point of ity over any and all other augers is the result of blades in shape, which shape is

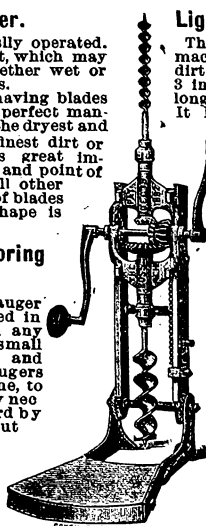
superior post hole of peculiar patented.



Will op- with the using one other ma- auger one-half may be use either esary first tak- of main replacing

Boss 2-speed Boring Machine.

erate a two-inch auger same effort required in and one-half inch in any chine, and for the small have a speed two and times faster. Two augers kept in the machine, to of which it is only nec to point it down ward by ing the gear frame out frame inverting and it.

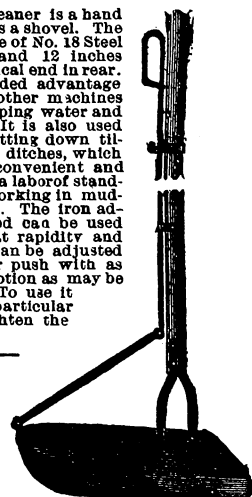


Lightning Drain Cleaner.

The Drain Cleaner is a hand machine used as a shovel. The dirt pan is made of No. 18 Steel 3 inches deep and 12 inches long, with vertical end in rear.

It has a decided advantage over other machines in digging water and dirt. It is also used for letting down tiling in ditches, which is very convenient and saves extra labor of standing and working in muddy ditches. The iron adjusting rod can be used with great rapidity and ease and can be adjusted to pull or push with as quick a motion as may be desired. To use it in any particular shape tighten the set screw.

Send
for
Prices.



Hand Screws

Case's Glue Clamps

Cabinet Makers Benches

Hand Screw Spindles made of strictly second growth Hickory—never anything else.

All threads cut with a saw to leave the grain solid—a patent process.

Nearly 700 of our Benches used by Grand Rapids Furniture makers alone.

WRITE FOR CATALOGUE.

Grand Rapids Hand Screw Co.

GRAND RAPIDS, MICH.

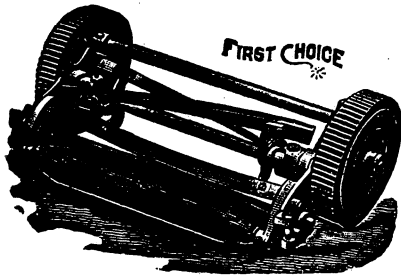
CHICAGO AGENTS, BRITTAN & BOND, 154 LAKE STREET.

BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and Bookseller 96-102 Reade Street, New York.

SURPLESS, DUNN & ALDER,

— INCORPORATED, —

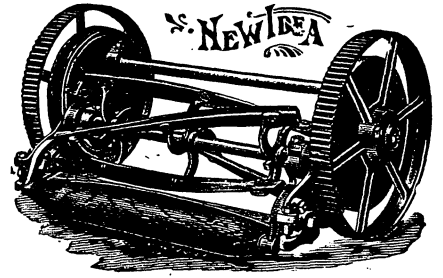
Nos. 97 Chambers and 79 Reade Streets, New York.

Representing only Leading American Hardware Manufacturers.

LAWN MOWERS.

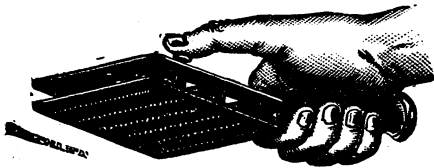
Both our Low and High Wheel Mowers have the right and left hand adjusting screw. Reel shaft runs in box, where all wear can be taken up.

Every machine guaranteed.



A full line of Boys' Garden Sets, Floral Sets Kitchen Hardware and Hardware for Children's Carriages.

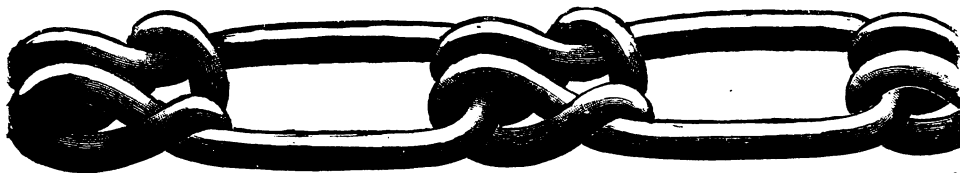
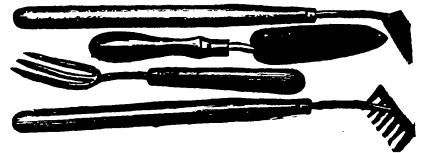
Sole makers of the celebrated "Maud S." Self-Cleaning Curry Comb.



B. B. NOYES & CO.,

Greenfield, Mass.

Send for full Catalogue and Prices.



outs, Kennel Chains, &c.; also cut to lengths for manufacturers' use.

The cut represents the exact size of 6/0.

Thirteen Sizes made, 6/0 being the Largest.

The Bridgeport Chain Co.'s Triumph

Chain, made into Halters Traces, Cow Ties, Tie-

FACTORY AT
BRIDGEPORT, CONN.

THE AMERICAN BIT BRACE & TOOL CO.

SUCCESSORS TO

THE AMERICAN BIT-BRACE CO.,

NO CHANGE IN NUMBERS.

ALL PARTS MECHANICALLY PERFECT.

RATCHETS UNEXCELLED.

The Largest and Best Line of Braces in the World.

Seventy-nine Styles and Sizes.

All Guaranteed.

122, 124 & 126 WASHINGTON ST.

BUFFALO, N. Y., U. S. A.



Instantly—the screw, we mean, with the **HOWARD-ALLARD SCREW DRIVER**. Original Patent Spiral Clutch Triple Bit. Quality High, Price Moderate. Two Sizes, each packed in a durable box, and filled with Three Sizes Bits. You press forward on Handle, the Spiral turns the Screw. Get the Original "A. L. LARD" from your Jobber, or write us for Circular and Prices. Sample A1, \$1.50; A2, \$1.25, postage paid.

SOLE AGENTS, THE ALFORD & BERKELE CO., 77 Chambers' St., P. O. Box 2002, New York.

TWIST DRILL BIT FOR WOOD.



—MANUFACTURERS OF—

Adjustable Monkey Wrenches, Parlor Door Hangers, Adjustable Hollow Augers, Standard Clamps, Adjustable Clamps, Twist Drill Bits for Wood, Carpenters' Clamps, Spoke Shaves.

THE CINCINNATI TOOL CO.,

CINCINNATI, OHIO, U. S. A.

A. S. HENN & CO.,

Manufacturers of

Hardware Specialties, Can Openers, Pocket Wrenches, Mining Knives, Clothes Line Pulleys, &c.

Send for Catalogue.

NEW HAVEN, CONN.



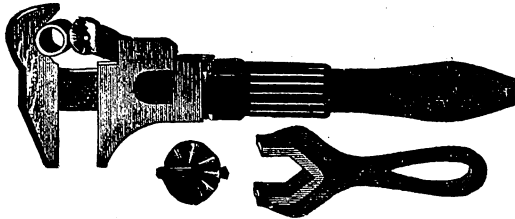
American Stamping Co.,

Manufacturers of

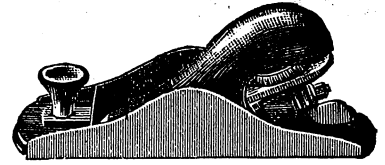
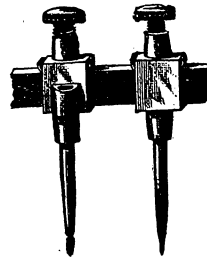
All Kinds of Tinware and Sheet Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

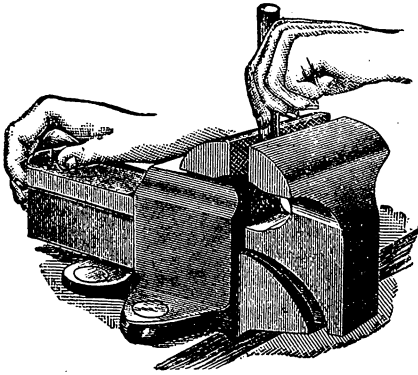
HIGH QUALITY TOOLS



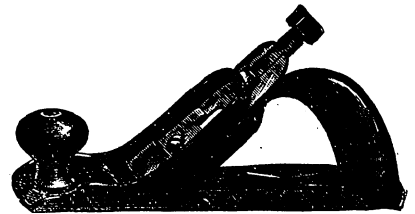
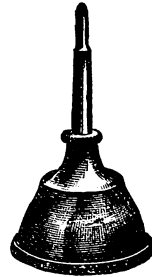
Donohue's Pat. Engineers' Wrenches,
Short or Long Sleeve Nuts, and
with Pipe Cutter.



Chaplin's Patent Iron Planes,
Corrugated Bottoms,
Checked Rubber
Handles.



Stephens' Patent Vises, Quick Adjust-
ing Cam and Toggle-Joint, Sta-
tionary or Swivel Base.



Challenge Iron Planes.
Simplicity of Construction.

Boardman's Pat. Wrenches, Excelsior Expansion Bits, Whitney Drills, Baxter's Wrenches,
Wood's Pat. Plumb and Levels, Devoe's Square Attachments, Gem Wrenches,
Malleable Oilers and Lamps, Pencil Attachments.

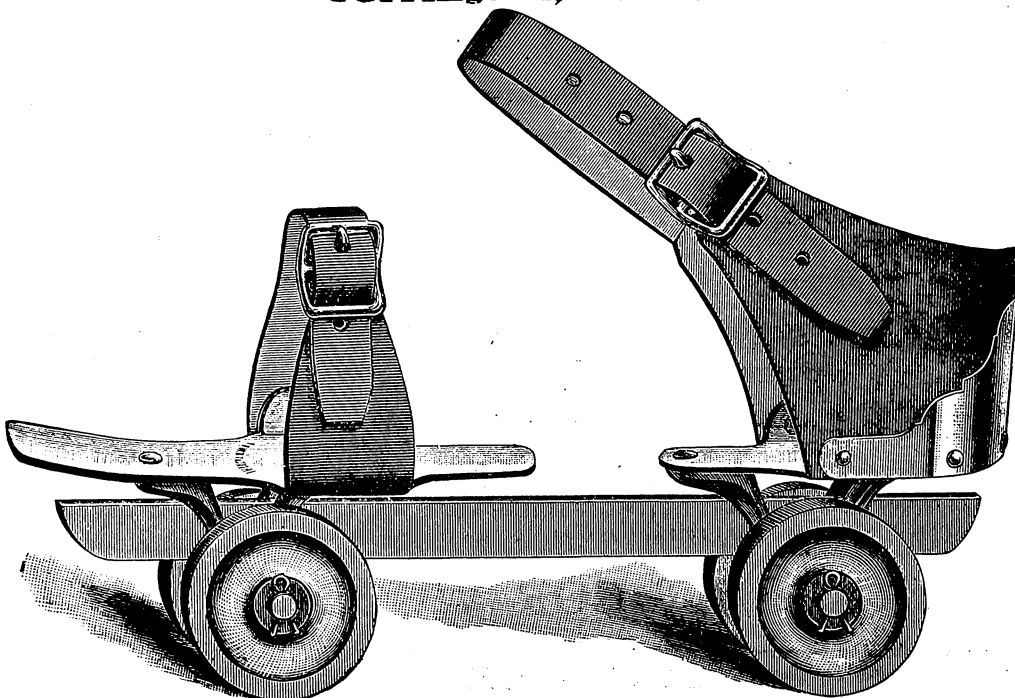
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

SIDEWALK AND RINK ROLLER SKATES OF ALL KINDS.

—:MADE BY:—

THE UNION HARDWARE CO.,

Torrington, Conn.



The above illustrates our new Extension Skate, one size fitting all shoes from 8 to 11 inches. We also have it in full clamp and in both plain and nickel finishes.

—NEW YORK OFFICE:—

TOWER & LYON, - - - - - 95 Chambers Street.

THE IMPROVED PROCESS GLUE CO.,

Purchasers of the Glue Business of The Le Page Co.

Gloucester, Mass.

New York City.

JOHN J. TOWER, of Tower & Lyon,
New York, President.

C. E. HUBBARD, Boston.
Treasurer.



The Improved Process Glue Co., having purchased from The Le Page Co., all its patent rights, formulas, glue stock and material, and having secured control of its glue factory, machinery, etc., will continue the manufacture of Liquid Fish Glues in all the various grades heretofore offered by The Le Page Co., under the personal supervision of Mr. Wm. N. Le Page, and under the Improved Process Patent issued October 26th, 1886. As is well known, the Improved Process by which these goods are made assures the highest strength with thorough uniformity as to quality, consistency and color. We call special attention to our Improved Process Family Glues, neatly put up for family use, and also to our Improved Process Carriage Glue for wood-work, put up in every variety of size and style. This Carriage Glue is undoubtedly the strongest and best glue for every variety of cabinet and wood-work, and has earned its high reputation. All our canned glues are put up with the new patent cap or fastening, patented January 22d, 1889, which has proved a great convenience and success. Our glues will be readily identified by our characteristic Blue Label, and the Trade-Mark shown at the head of this page. Send for Price-List. Messrs. TOWER & LYON will have charge of our New York office. Very truly yours,

THE IMPROVED PROCESS GLUE CO., New York Office, 95 Chambers St.

Burgess Gem Gasoline Furnaces,

ALL ARE EQUIPPED WITH THE CYLINDRICAL BURNER.

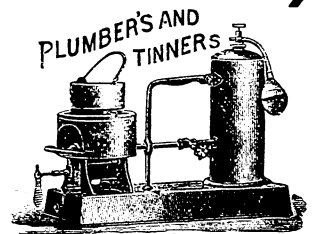
Price each, Tin Reservoir, \$7.00. Plumbers' Hood for No. 3, 50 cents.
Copper " 8.50. Pot for No. 3 or 4, 50 cents.
No. 3 guaranteed to work out of doors or on roofs in all kinds of weather
No 4 will melt 12 lbs. of lead in 8 minutes, and will heat the coppers and
melt lead at the same time.

For Sale by all First-Class Jobbers, or Send to us for Descriptive Circulars.

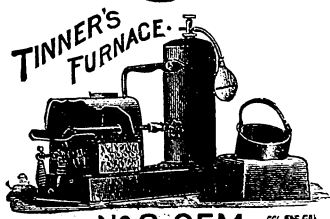
Burgess Soldering Furnace Co.,

J. BURGESS & SONS, Props. and Mfrs.

COLUMBUS, O.



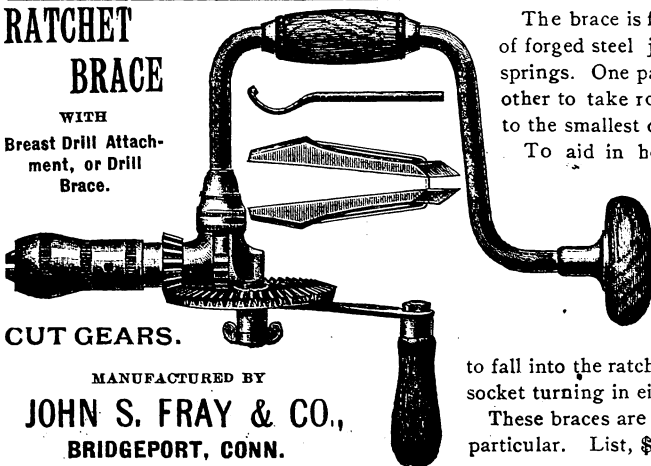
No 4 GEM



No 3 GEM

RATCHET BRACE

WITH
Breast Drill Attach-
ment, or Drill
Brace.



CUT GEARS.

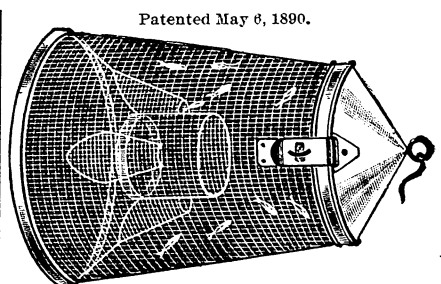
MANUFACTURED BY

JOHN S. FRAY & CO.,
BRIDGEPORT, CONN.

The brace is furnished with two sets of forged steel jaws having our patent springs. One pair for ordinary bits; the other to take round shank drills down to the smallest ordinary size.

To aid in holding firm y the round shank drills, we furnish a small sleeve wrench, which can be used advantageously, the socket being instantly locked by turning the ring to allow both pawls to fall into the ratchet, thus preventing the socket turning in either direction

These braces are fully guaranteed in every particular. List, \$36 per doz.



Patented May 6, 1890.

LITTLE DAISY MINNOW TRAP.

A sure thing for good, live minnows. Will last a lifetime. Price, single trap, \$3.50. Liberal discount to the trade.

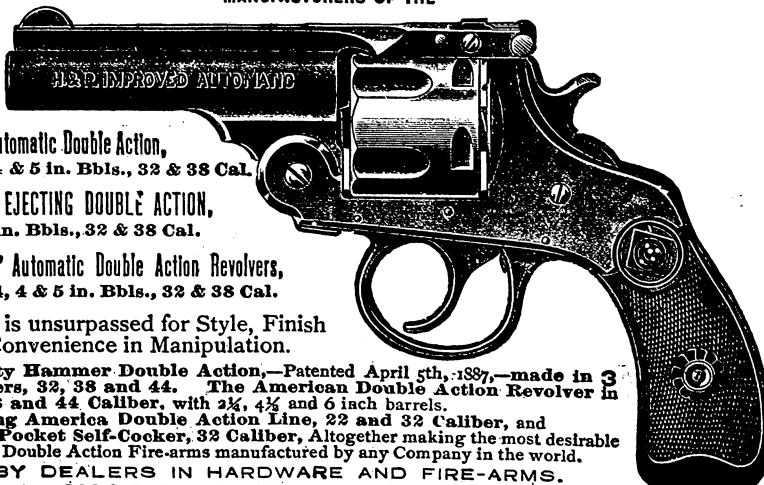
Illinois State Fish Commission,
Office of S. P. Bartlett, Sec'y,
QUINCY, ILL., Jan. 19, 1892.

Messrs. Cochenour & Wilson, Olney, Ill.
After two years' use of your "Little Daisy Minnow Trap" I find that it does its work well and satisfactorily. It is a source of great gratification to me to have fresh, lively minnows when I want them, and these your trap furnished me. I can cheerfully recommend it to anglers as a valuable addition to their outfit.
Yours respectfully,
S. P. BARTLETT, Sec'y Ill. State Fish Com.

ED. C. WILSON, Exclusive Manufacturer
OLNEY, ILL.

Harrington & Richardson Arms Company

MANUFACTURERS OF THE



Improved Automatic Double Action,
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

IMPROVED EJECTING DOUBLE ACTION,
3 1-4 in. Bbls., 32 & 38 Cal.

"Premier" Automatic Double Action Revolvers,
3 1-4, 4 & 5 in. Bbls., 32 & 38 Cal.

This line is unsurpassed for Style, Finish and Convenience in Manipulation.

The Safety Hammer Double Action.—Patented April 6th, 1887,—made in 3 Calibers, 32, 38 and 44. The American Double Action Revolver in 32, 38 and 44 Caliber, with 2 1/4, 4 1/2 and 6 inch barrels.

The Young America Double Action Line, 22 and 32 Caliber, and The Vest Pocket Self-Cooker, 32 Caliber, Altogether making the most desirable line of Double Action Fire-arms manufactured by any Company in the world.

SOLD BY DEALERS IN HARDWARE AND FIRE-ARMS.

WORCESTER, MASS., U. S. A.

HOW TO KEEP A STORE

BY S. H. TERRY.

406 PAGES, 5 x 7 1/2 INCHES.

POST-PAID, \$1.50.

Among the subjects discussed are: The selection of a business; choice of a locality; buying a stock of goods; examining, marking and arranging goods; how to advertise; employment of clerks; selling for cash and credit; keeping accounts; expenses; copartnerships; losses by fire, theft, &c.; influences of social life on business; buying at auction; investment of profits; insolvency; business qualifications.

FOR SALE BY

DAVID WILLIAMS, Publisher and Bookseller

96-102 Reade St., New York.

DAME, STODDARD & KENDALL,

DIRECT IMPORTERS OF

GEO. WOSTENHOLM & SON'S Pocket Knives, Razors, Erasers,
Farriers' Knives.

WADE & BUTCHER'S Razors.

JONATHAN CROOKES & SON'S Pocket Knives.

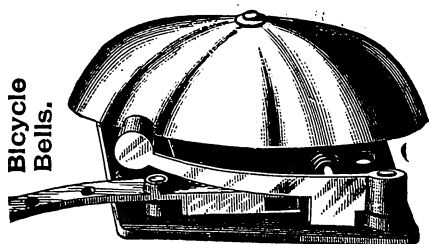
JAS. CHESTERMAN & CO.'S Tape Measures.

GERMAN Pocket Knives, Scissors, Razors.

SOLE SELLING AGENTS IN THE UNITED STATES FOR

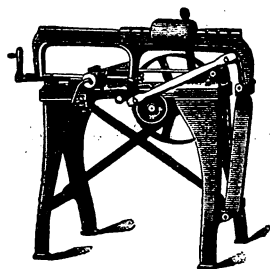
ENGSTRÖM'S CELEBRATED SWEDISH KNIVES AND RAZORS.

374 Washington Street, Boston, Mass.



BEVIN BROS. MFG. CO., Easthampton, Conn.
Manufacturers of
Sleigh Bells, House, Tea, Hand, Gong Bells, &c.

STOVER POWER HACK SAW.



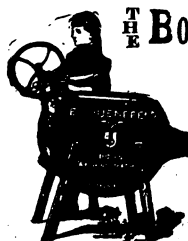
Cuts off any size
or Shape of Metal
Up to 4½
Inches

No skill required
to run it. When
bar is cut off the
machine automatic-
ally lifts the saw
from the work and
stops.

The pressure on
the saw is much
greater on the
forward stroke
than on the return.

THIS IS THE MOST PRACTICAL MACHINE FOR THE
PURPOSE ever offered to the trade.
No shop can afford to be without it.

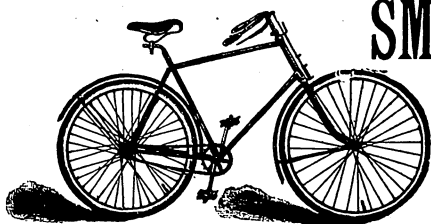
Satisfaction guaranteed. Price, \$25.00
STOVER NOVELTY WORKS, 22 River St., Freeport, Ill.



THE Boss Washing Mch.

An Entirely New Invention.
Double acting, working with
two cylinders in opposite
directions. The greatest
saver of household labor
ever invented.

E. H. HUENEFELD,
CINCINNATI, O.
Send for Circular.



ROAD RACER.

RACINE HARDWARE MFG. CO., (makers of the
celebrated Racine Boats), RACINE, WIS., agents
for Wisconsin and all territory west of the
Mississippi River.

SMALLEY BICYCLES.

Four Styles, LIGHT ROADSTER, (with mud
guards and brake); ROAD RACER, TRACK RACER,
(new style handle bars); LADIES' WHEEL,
strictly high grade, DISCOUNTS RIGHT. GOOD
AGENTS wanted in every town in the United
States. Write us for catalogue and we will
interest you. Please mention this paper.

MARBLE CYCLE MFG. CO.,

Factory, - - - PLYMOUTH, IND.

RETAIL DEPOT, 271 WABASH AVE., CHICAGO, ILL.

THE Waverly



STRICTLY

HIGH

GRADE.

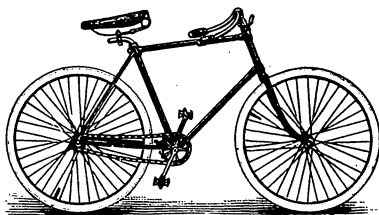
\$100.00

EVERY

WHEEL

GUARAN-

TEED.



Get our Catalogue and prices to dealers.
Our line will make you more
money than any other goods made.

INDIANA BICYCLE CO.,

INDIANAPOLIS, IND.



Diamond  Cycle Wrench,
WITH SPOKE GRIP ATTACHMENT.

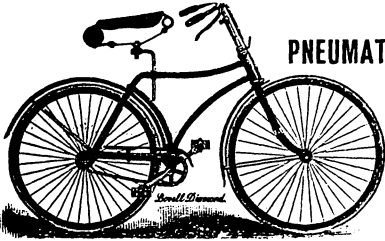
All Steel, Drop Forged, Case Hardened. Lightest, neatest and strongest. Weighs 5¼
ounces, 4¼ in. long. Adjustment 1¼ in. Write for prices and descriptive circular.

Manufactured
by the

GENDRON IRON WHEEL CO.,

Sold by all Cyc's and
Hardware Dealers
TOLEDO

Lovell Diamond Cycles



HIGHEST GRADE.
PNEUMATIC, CUSHION AND SOLID TIRES.
FOR LADIES AND GENTLEMEN.

MANUFACTURED BY
John P. Lovell Arms Co.
BOSTON, MASS.
CYCLE CATALOGUE FREE.

WHEN ECONOMY IS WEALTH 'TIS FOLLY TO BE EXTRAVAGANT.

For people who want a good article without paying for gilt-edge and nonsense we can offer them the best

MEDIUM GRADE LINE OF BICYCLES IN THE UNITED STATES.

Warranted by the critical test of time to be unequalled, and fully guaranteed by the manufacturers—cushion and pneumatic tires.

**THE ST. NICHOLAS LINE
IS WITHOUT COMPETITION.**

Write to us for Catalogues.

GEO. R. BIDWELL CYCLE CO.,

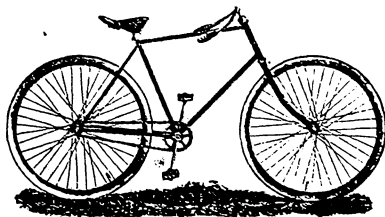
308-310 West 59th St., N. Y.

Liberal Discounts to Agents.

WESTERN WHEEL WORKS.

BICYCLE MANF'TRS

From \$20 to \$135.



MOST COMPLETE LINE MADE.

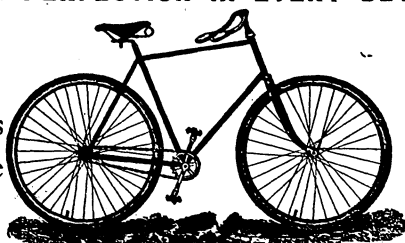
OFFICE AND FACTORY:

Wells, Schiller and Sigel Sts., and N. Park Ave., Chicago, Ill., U.S.A.

MONARCH BICYCLES ARE PERFECTION IN EVERY DETAIL.

FOUR STYLES.

Some makes
are older, but none
better.



POPULAR WEIGHTS,
ELEGANT DESIGNS
AND
BEAUTIFUL FINISH.

You can handle **MONARCHES** to advantage in your business. 1893 Catalogue now ready. Send for it.

MONARCH CYCLE CO., 42, 44, 46, 48, 50 and 52 N. Halsted St.
CHICAGO.

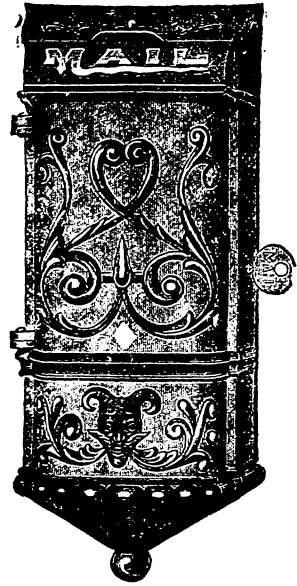
Yacht ^{AND} Boat Hardware.

L. W. FERDINAND & CO.,
BOSTON, MASS.

The HENRY C. HART MFG. CO.,
DETROIT MICH.

MANUFACTURERS OF

Hardware Specialties.



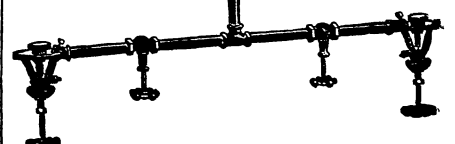
Send for Catalogue and Prices.

Full Line of Mail Boxes.

Reliable Torches are
what you want.



Made either for Oil or
Gasoline.

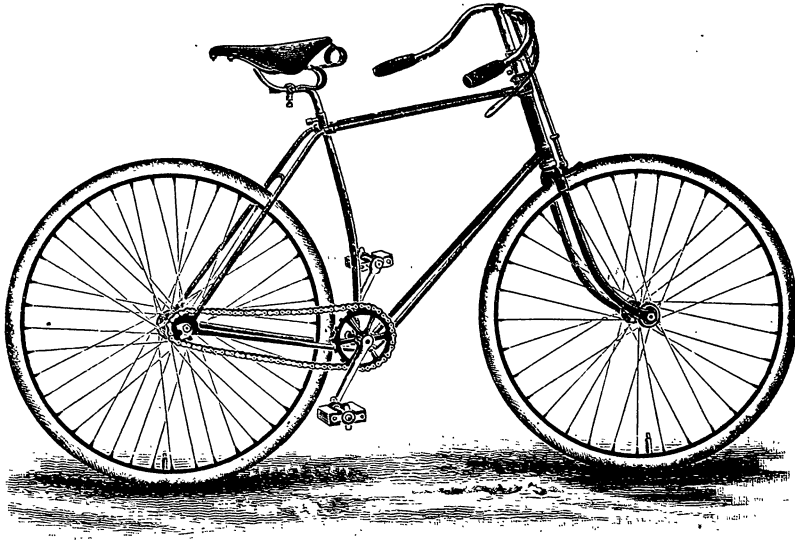


These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner.

Write us for prices. A liberal discount given to the trade. Manufactured by
THE SCHNEIDER & TRENKAMP CO.,
Nos. 479 to 497 Case Ave., Cleveland, Ohio.

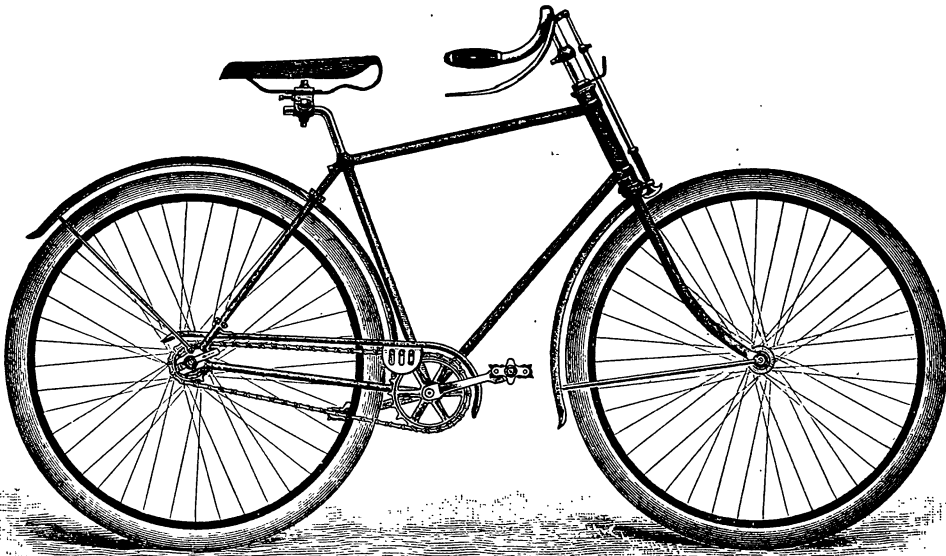
The New York Safety Dumb Waiter,
"The Manhattan Dumb Waiter,"
"The Improved Humphrey Hand Elevator,"
Made specially to be sold by Hardware Stores. Thousands in use. Catalogues on application.
THE STORM MANUFACTURING CO.
NEWARK, NEW JERSEY.
Formerly of Poughkeepsie, New York.

THE SENSATION OF THE SEASON!



The High Grade Hackney.

The sprocket on this bicycle is perfect. The shape and size of the teeth are scientifically correct, and the sprockets are so accurately made that a thousand of them placed one upon another would form a fluted pillar with flutes as regular as though made in one piece.



The Popular-Priced Falcon.

The best bicycle sold at Medium Grade price. Complete in every detail and made of best materials. Notice the spring-top oil cup. Press the spout of your oiler against the top and the cover recedes. When filled, remove the spout and the top closes. Simple, neat and effective.

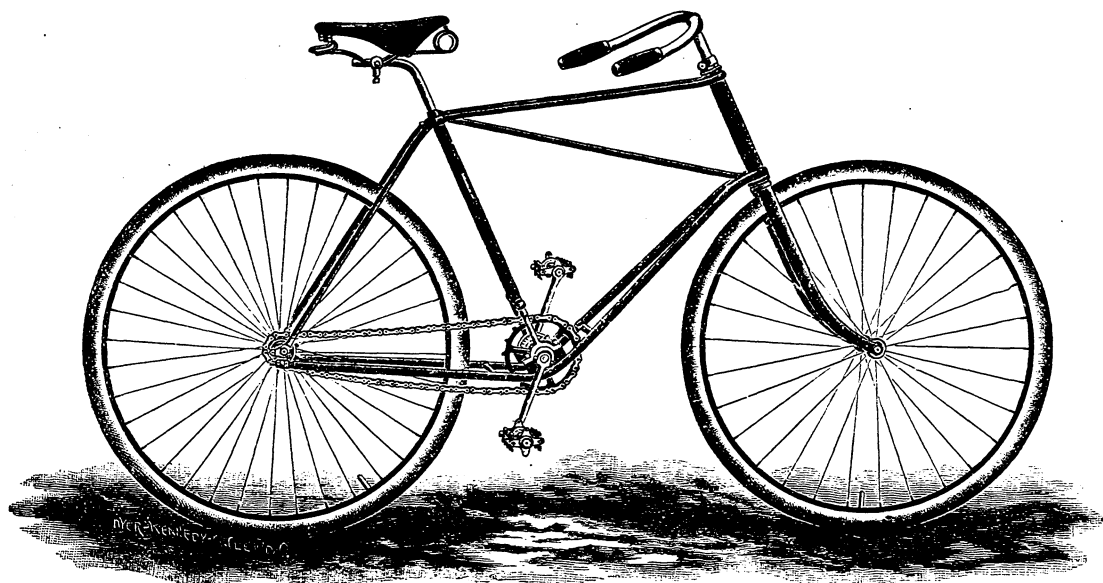
THE W. BINGHAM COMPANY,
Cleveland, Ohio

"The Winton is a Winner."

The Easiest Running Machine
in the World.

WINTON LIGHT ROADSTER.

HIGHEST GRADE THROUGHOUT.



No Agency complete without this **DISTINCTIVE** and
thoroughly **FIRST-CLASS** machine.

WINTON ROADSTER.

All on, 40 lbs. - - - - - - - Price, \$150.00.

WINTON LIGHT ROADSTER,

Stripped, 30 lbs, - - - - - - - Price, \$150.00.

WINTON LADIES'

Improved design, 38 lbs., - - - - - - - " \$150.00.

WINTON RACER,

Nothing like it. 20 lbs., - - - - - - - " \$160.00.

True Double Diamond Frame,

Winton Perfect Pneumatic Tires.

If there is no agent in your place, know all about us by asking for a catalogue.

The Winton Bicycle Co.,

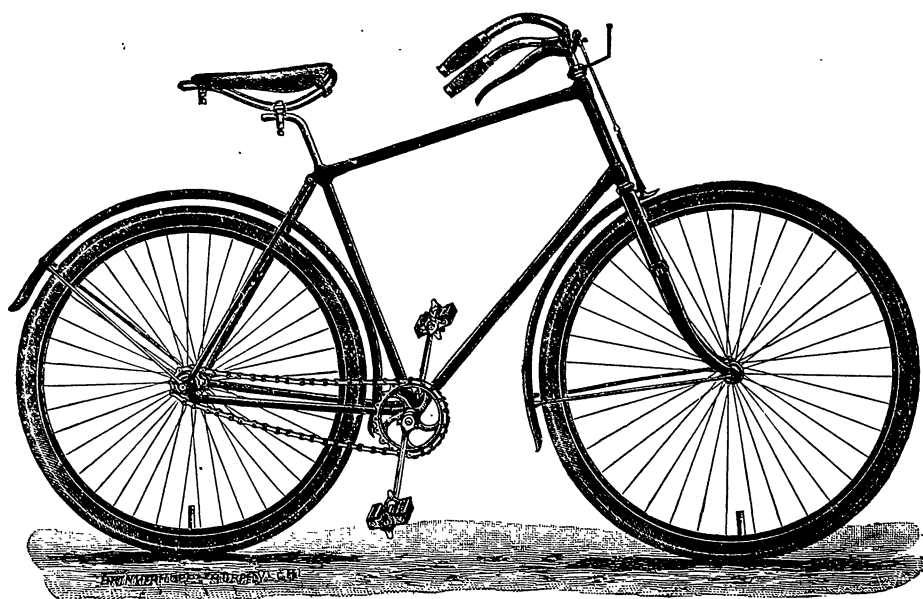
114 PERKINS AVE., CLEVELAND, OHIO.

UDELL WOODENWARE CO., St. LOUIS,

Distributing Agents in Texas and Missouri, except Kansas City.

SWIFT BICYCLES.

Simply
Made
Bicycles
Need
Few
Repairs



33
Years'
Experience.
115,000
in
Use.

HOLBEIN ~~SWIFT~~

32 LBS. GUARANTEED TO CARRY 200 LBS.

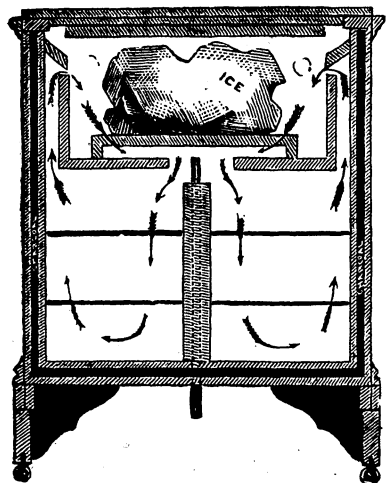
~~SWIFT~~ BY NAME,

BY NATURE ~~SWIFT~~

Agents who handle
the ~~SWIFT~~ have less
trouble in selling, be-
cause the buyers know
that the first is in all
probability the only
expense.

COVENTRY
MACHINIST'S CO.,
BOSTON. CHICAGO.
SAN FRANCISCO.

GEORGE N. PIERCE & CO., BUFFALO, N. Y.



MANUFACTURERS OF
Japanned and Brass Bird Cages
IN 167 STYLES.

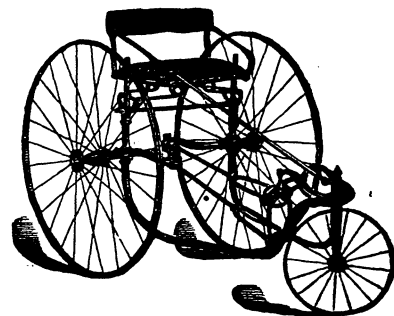
HARDWOOD and GRAINED
Refrigerators and Ice Chests,

Guaranteed Dry-Air and Perfect Goods, in
71 Sizes and Patterns.

The "Queen" Tricycle,

in 20 Sizes and Patterns. The one
Tricycle in this country sold to
the trade on its MERITS.

New York Office and Warerooms, 23 Warren St.



Full Illustrated Catalogue and Special Prices Furnished to the Trade on Application.

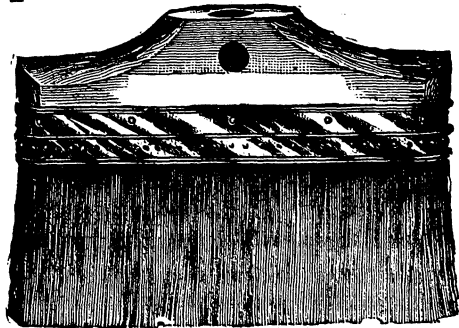
**WIRE
AND
IRON
WORK.**

Our temporary shops are now
in good running order, and orders
are being promptly filled. We
shall be glad to name prices, etc.,
for our productions upon request.

**HUNTER'S
SIFTERS.**

THE FRED J. MEYERS MFG CO., Covington, Ky.

**7 BRANDS OF
Whitewash Brushes.**



**HORSE, SHOE, WINDOW,
DUSTING, FACTORY
AND MACHINE**

BRUSHES,

Made especially for the hardware
trade. When in need of brushes
send for our brush Catalogue.

CINCINNATI MFG. CO.,

211 Walnut St., CINCINNATI, OHIO.

Underhill, Clinch & Co.,

94 Chambers St., New York.

O. Ames & Sons, Shovels, Spades and Scoops,
Chadborn & Coldwell Mfg. Co.'s Lawn Mowers.
Utica Tool Co.'s Hoes and Rakes.

Sheble & Klemm's Manure and Hay Forks.
David Wadsworth's Scythes.

English Riveted Scythes and Grass Hooks.

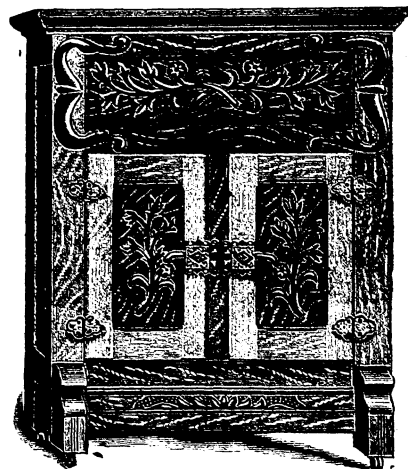
Malleable Iron Rakes,

Wooden Rakes,

Scythes, Snaths, Scythe Stones,

Poultry Netting, Green Wire Cloth,
&c., &c., &c.

K



KANKAKEE REFRIGERATORS.

Solid Oak, Dry Air, Non-Conductor Filling.

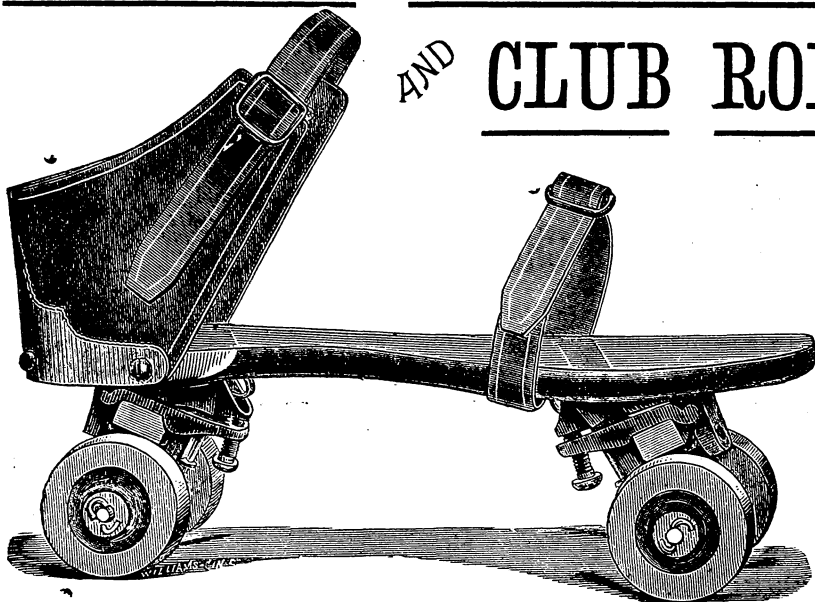
New Designs, Raised Hand Carvings, Solid
Bronze Trimmings, Lever Locks.

HINGED BASEBOARD.

We want a live dealer in every town to push
their sale. Send for catalogue and special
prices. Costs nothing to investigate.

KANKAKEE MANUFACTURING CO., Kankakee,
Ill.
CHICAGO, 268 WABASH AVE.,

HENLEY'S CELEBRATED RINK AND CLUB ROLLER SKATES.



A full, new and complete stock of Roller Skates, Skate Repairs and Rink Supplies. Address for 80 page catalogue and prices,

M. C. Henley,
RICHMOND, IND.

This GUN has rebounding locks and the barrels can be taken off and put on again without cocking the arm, and when cocked the hammers may be let down gradually, and without the full force of the blow. It is simple in construction, having very many less pieces than any other hammerless gun.

Easily Tipped and Cocked,
Damascus Barrels,
Handsomely Engraved,
Italian Walnut Stock.

SEND FOR DESCRIPTIVE
CATALOGUE.



New Hammerless Double Gun,

MANUFACTURED BY

FOREHAND ARMS CO.

Worcester, Mass.

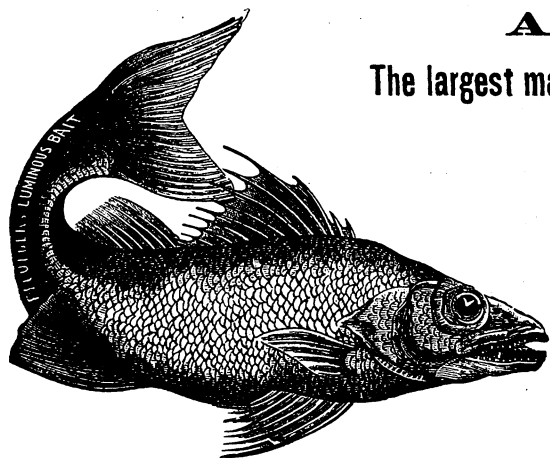
PRICE VERY LOW.

The Enterprise Manufacturing Co., AKRON, OHIO, U. S. A.

The largest manufacturers of Fishing Baits and Anglers' Specialties in
the United States.

EXCLUSIVELY MANUFACTURERS

Trolling Spoons, Spinners, Phantom Minnows, Hard and Soft Rubber Minnows, Frogs, Crawfish, Grasshoppers, Insects, Artificial Flies, Snell Hooks, Furnished Lines, Sinkers, Floats, Fly Cream, Fish Stringers, and many other new goods too numerous to mention.



(With "LUMINOUS BAIT" you catch Fish while with others you might.)

Illustrated Catalogue Free to Dealers.

Please mention *The Iron Age*.

DO YOU AIM



To Make a Bull's Eye
In Your Business or at the Range?

If you deal in ARMS or AMMUNITION or shoot a Rifle, Pistol or Shot Gun, you will make a HIT by sending for the IDEAL HAND BOOK.

IDEAL MFG. CO., New Haven, Ct., U. S. A.

Please mention *The Iron Age* when you write.

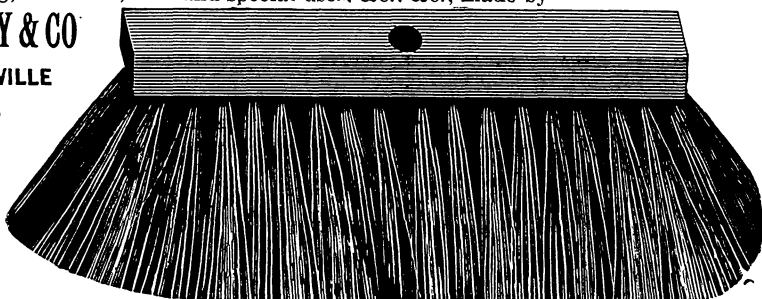
PUSH BROOMS

of every description, Rattan, Steel Wire and Bass, for all uses. Stable, Street, Bloom, Chill, Frog Switch, shop and scrubbing work. Brooms for heavy and light work. Brushes of all kinds for Casting, Moulders, Mill and special uses. &c.. &c., made by

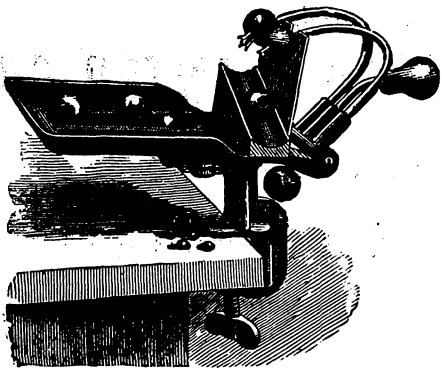
JOS. LAY & CO

RIDGEVILLE
IND.

Send for
Catalogue
and
prices.



THE FAMILY CHERRY STONER.



The best Machine ever invented for stoning cherries.

The *only Machine* that does not mash the fruit and waste the juice.

No other machine will fill its place.

Stock in New York, Philadelphia, Cincinnati, Indianapolis, Chicago and St. Louis, from which orders can be shipped promptly.

GOODELL COMPANY,
Sole Manufacturers, **Antrim, N. H.**

TRAVERS BROS. CO., **WM. H. JACOBUS,**
— MANUFACTURERS OF —

PURE MANILA AND SISAL

ROPE.

MANILA, SISAL AND MIXED

BINDER TWINE.

Mexican Hammocks, Hammock Attachments, Peerless Sash Cords, Hardware Twines, Agts. Silver Lake Sash Cords.

Office, 107 Duane St.

16 Thomas St., N. Y.

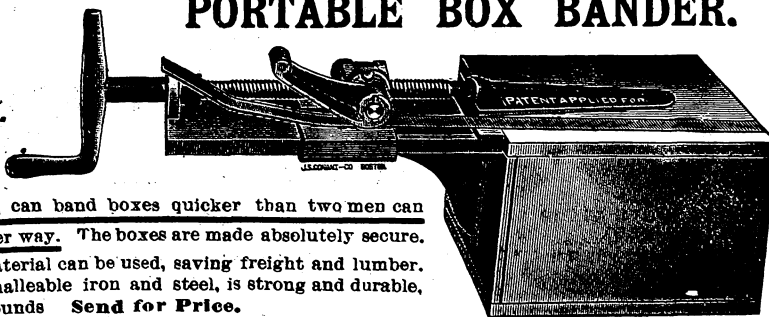
No. 90 Chambers St., New York.

New York Office of

J. F. Wollensak.
Barnes Mfg. Co.
Penn Lock Works.
Lorenz Bommer.
Palmer Hdw. Mfg. Co.
Dibble Mfg. Co.
Wire Goods Co.
Garritt & Beach.
Prindle Mfg. Co.
Tuck Mfg. Co.
Henis Vegetable Press.
Dille & McGuire Mfg. Co.
National Rivet Works.
Lufkin Rule Co.
Wolcott Hdw. Co.
Zimmerman's Blind Adjusters.
Burnside Cedar Faucets.
Fibre Head Mallet.
Glazier's Patent Hocks.

**SOON
PAYS
FOR
ITSELF.**

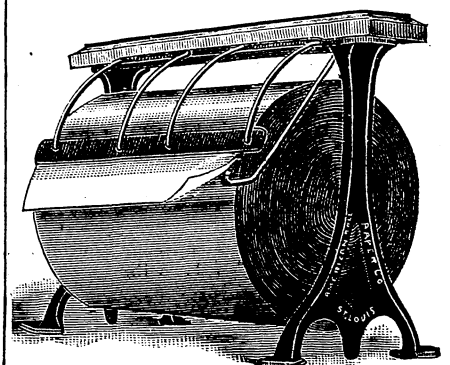
PORTABLE BOX BANDER.



One man can band boxes quicker than two men can in any other way. The boxes are made absolutely secure. Lighter material can be used, saving freight and lumber. Made of malleable iron and steel, is strong and durable, weighs 8 pounds. Send for Price.

GOODELL & HARDING, Manufacturers,

BURLINGTON, VT.



**THE ECONOMIC
HOPKING ROLL PAPER CUTTER.**

Made in all sizes, 6 to 36 inches, at \$1.50 each Japan and Hardwood Finish.

Made by the

American Roll Paper Co.,
St. Louis, Mo.

HOWE BROS. & HULBERT'S

CORK SCREWS

ARE NOW MADE BY

**C. T. WILLIAMSON'S
WIRE NOVELTY CO.,**
NEWARK, N. J.

**HAND FORGED
CRUCIBLE STEEL,
HARDENED and TEMPERED.
WARRANTED.**

SEND FOR CATALOGUE.

CHAS. DAVIES & CO.,
MANUFACTURERS OF
LADDERS,
Extension and Single. Fire, Railroad and Painters' Ladders.

LAWN SWINGS,
Window Jacks and Swing Scaffolds. Trade discount 20 and 5% list. We pay the freight. Catalogue Furnished.
329 to 335 West 3d St.,
Illamspport, Pa

Challenge Iceberg Hardwood Refrigerators,

Manufactured by

CHALLENGE CORN PLANTER CO.

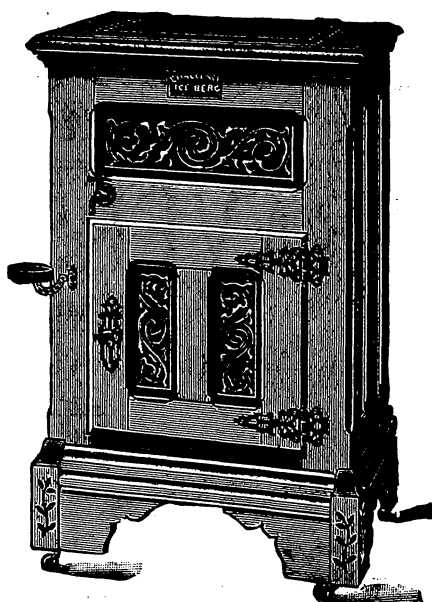
GRAND HAVEN, MICH., U. S. A.

The Largest Factory of its Kind in the World.

Write for prices, and for illustrated seventy-six page catalogue.

AGENTS:

D. W. Cushing,
Boston, Mass.
F. T. Witte Hdw Co.
New York, N. Y.
F. M. Borden & Bro.,
Philadelphia, Pa.
Simmons Hardware Co.,
St. Louis, Mo.
A. Baldwin & Co.,
New Orleans, La.
J. Pritzlaff Hdw. Co.,
Milwaukee, Wis.
Buhl, Sons & Co.,
Detroit, Mich.
Chicago Stamping Co.,
Chicago, Ills.
Gurney Refrigerating Co.,
San Francisco, Cal.



Refrigerators.



The FAMOUS
Leonard
Cleanable
Excels All Others.

New Designs,
More Selling
Points,
Better Advertised

Factory Enlarged
Prices Reduced.

Send for Catalogue. Secure Agency.

Wholesale Warehouses in all the principal cities.

Grand Rapids Refrigerator Co.

Sole Manufacturers,
Grand Rapids, Mich.

AMERICAN TOOL COMPANY,
NEW YORK,
MANUFACTURERS OF
TOOL CHESTS

Of all sizes, complete with tools, for Hardware, Toy,
Notion and Variety trades.
Factory and Salesroom,

200 West Houston Street, near Varick.
Also Machinists' Tool Chests, empty. Illustrated Cata-
logue and prices furnished on application.

A Triumph in Small Bore Rifles. STEVENS' "FAVORITE" RIFLE.



10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET. 10 SHOTS AT 40 FEET.

22 LONG RIFLE 22 SHORT 22 CB 22 BC

25 STEVENS

ABOVE TARGETS
ARE
ACTUAL SIZE.

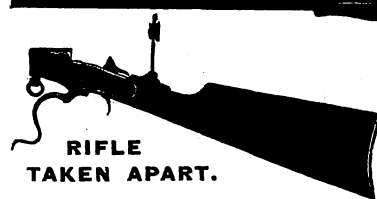
Made for the 22 or 25 Rim Fire Cartridge.

WEIGHT, 4 3/4 POUNDS.

22-INCH BARREL.

LEVER ACTION LIKE SHARPS.
TAKEN APART IN TEN SECONDS.

IT IS SIMPLY IMPOSSIBLE
TO MAKE MORE
ACCURATE SHOOTING BARRELS
THAN ARE ON THIS RIFLE.



No. 17. Plain Open Sights.....\$12.50
No. 18. Vernier, Open Back, and Beach Front Sights..... 17.00
No. 19. Lyman Peep, Open Back, and Lyman Front Sights, 17.00

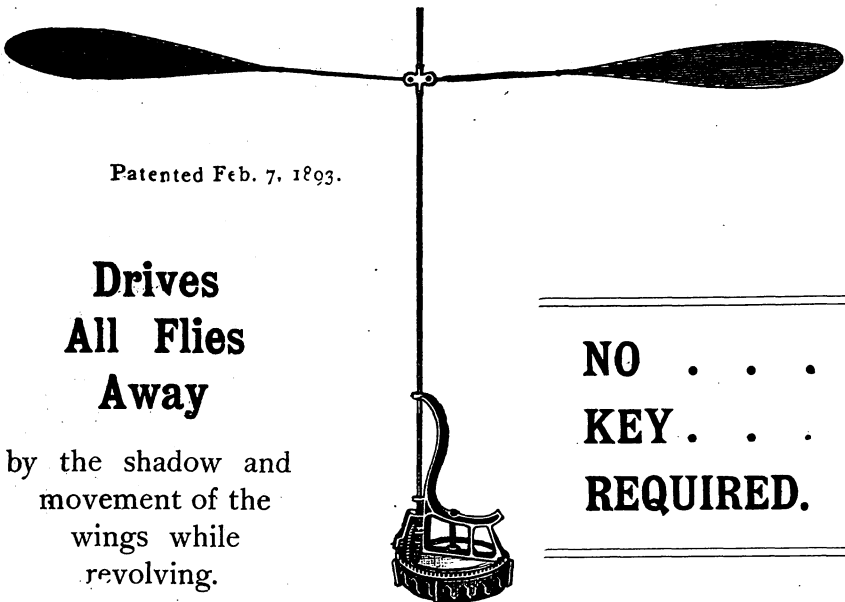
A 60 Page Catalog showing our full line of Fire Arms with TRADE PRICE LIST sent with pleasure to all dealers.

J. Stevens Arms & Tool Co.,

P. O. Box 5729.

Chicopee Falls, Mass., U. S. A.

THE NEW COLUMBIA FLY FAN.



Patented Feb. 7, 1893.

**Drives
All Flies
Away**

by the shadow and
movement of the
wings while
revolving.

**NO . . .
KEY . . .
REQUIRED.**

ENTIRELY NEW IN CONSTRUCTION.

WE have embodied in the Columbia Fan some novel and taking features. It is finished in nickel or antique bronze and is very ornamental.

It is wound up by holding the base in one hand and turning the wing holder with the other.

It will run effectively one hour after each winding.

It has an automatic stop which prevents it unwinding when wings are taken off. It can be started or stopped instantly by a simple turn of the rod.

For the Dining Room, Sick Room, Office, Camp or at the Seaside it is a luxury that, if tried, would not be dispensed with for many times its cost.

In Hot, Sultry Weather its use insures cleanliness at meals, and comfort and rest to the weary.

Every Fan Guaranteed.

Securely packed—one dozen in a case.
Price per dozen, \$20.00.
Weight per case, 55 lbs.
Discount in case lots, 20 %.
Discount less than case lots, 10 %.

The Fowler Improved Keyless Fly Fan.

Heretofore acknowledged the best in the market. It is a great home comfort. Send for descriptive circular.

Price, \$24 per doz.
Discount, 20 % in full case lots of 1 doz.
" 10 % in less than case lots of 1 doz.

THE MARYLAND ROASTER AND BAKER.

THE SCIENTIFIC PRINCIPLE FOR ROASTING

Meats, Game, Poultry, Fish, &c. For Baking
Bread, Cakes, Puddings, Custard,
Beans, &c.



The Simplest, The Best, The Cheapest.
Made of Best Quality American Iron.

No.	Length.	Width.	Depth.	Price Each.
8	10 1/4 in.	6 in.	6 in.	\$0.65
10	14 1/2 in.	10 in.	7 in.	1.00
11	16 1/2 in.	11 in.	7 1/2 in.	1.25
12	13 in.	12 in.	8 in.	1.50

DISCOUNT, 50 PER CENT.

MANUFACTURED ONLY BY

MATTHAI, INGRAM & COMPANY,

OFFICE AND SALESROOMS,

No. 120 HANOVER STREET,

Factory bounded by Ohio Ave., Light, Winder and Byrd Sts.,

BALTIMORE, MD.

New York Branch, - - - - - 42 CLIFF STREET.

LEADING MANUFACTURERS OF

Stamped Tinware, Patent Pieced Ware, Japanned Ware, Galvanized Iron Ware,
Dripping Pans, &c.

We are recovering from the effects of the fire that occurred at our factory on the 14th u't. Our drip pan department, also the retinning rooms, were damaged, but we have already resumed operations in both of them and are prepared to fill orders for the full line of goods. There was but a slight delay occasioned by the fire, as in all other departments, except the two above mentioned, business continued as usual; and while the ruins were still smoking shipments were being made from the shipping department.

IMPROVED EDITION OF THE IRON AGE HARDWARE PRICE BOOKS.

Arranged by R. R. WILLIAMS, Hardware Editor of the Iron Age.

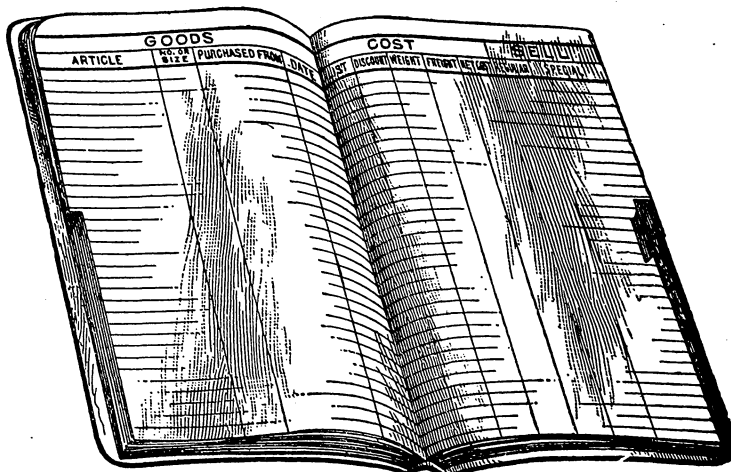
These Books are printed on paper of superior quality and bound in grain seal leather.

Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

A, 200 pages, - - - - -	\$1.00
A F, 200 pages with flap, - - - - -	1.25
A 2, 400 pages, - - - - -	1.50
A F 2, 400 pages with flap, - - - - -	1.75



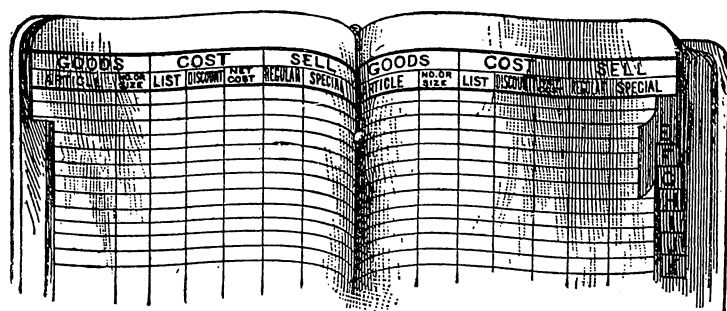
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

B, 200 pages - - - - -	\$1.00
B F, 200 pages with flap, - - - - -	1.25
B 2, 400 pages, - - - - -	1.50
B F 2, 400 pages with flap, - - - - -	1.75



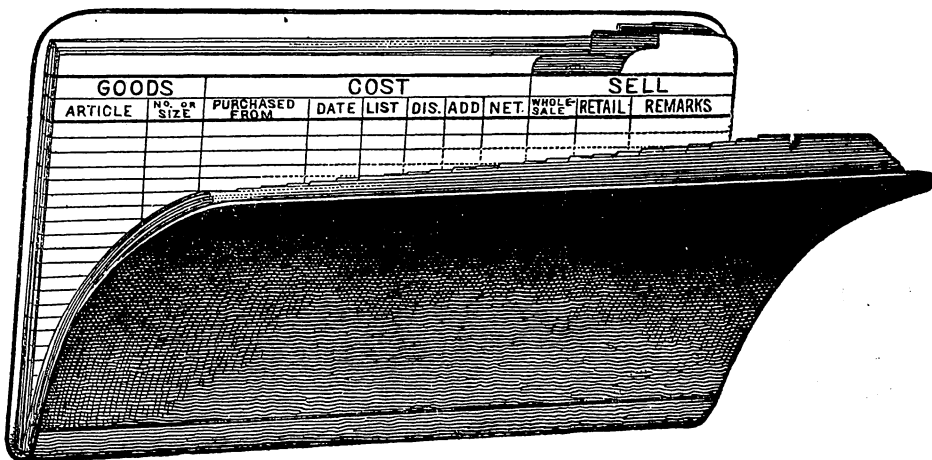
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

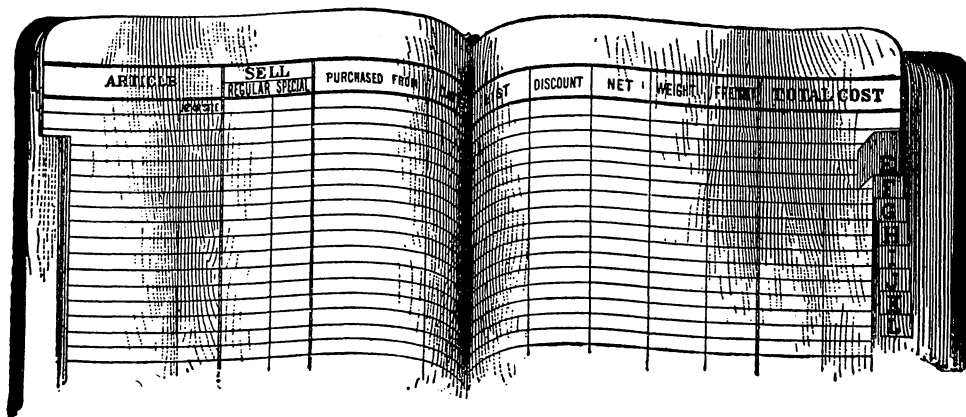
Size, 4½ x 7½ in.; grain seal leather.

FOUR EDITIONS.

C, 200 pages, - - - - -	\$1.00
C F, 200 pages with flap, - - - - -	1.25
C 2, 400 pages, - - - - -	1.50
C F 2, 400 pages with flap, - - - - -	1.75



Hardware Price Book C.



Hardware Price Book D.

Arrangement is adapted to the requirements of the trade in this direction. Size 5¼ x 8 in.; grain seal leather.

FOUR EDITIONS.	D, 200 pages, - - - - -	\$2.00	D 2, 400 pages, - - - - -	\$3.00
	D F, 200 pages, with flap, - - - - -	2.50	D F 2, 400 pages, with flap, - - - - -	3.50

Price Book D will recommend itself particularly for desk and store use, and for salesmen on the road.

The name of the article, its number or size and the selling price are the first to meet the eye on the left-hand page, as embodying information desired when the selling price is required. The other headings follow in convenient order, by which a detailed memorandum regarding the goods may be kept, the whole being seen at a glance. A number of pages at the back of the book are arranged for memoranda, which will be found a great convenience. This ar-

Sent, post-paid, on receipt of price by **DAVID WILLIAMS, Publisher, 96-102 Reade St., New York.**

KESNER'S

ALWAYS COOL SAD IRON HOLDER.

Indispensable to every Housekeeper and Laundry. Sells at sight and pays the Dealer a Large Profit. They pack closely and ship cheaply. Every Holder Guaranteed to give Absolute Satisfaction.

It is the best and only perfect Iron Holder made. It is strong, durable, unburnable, and will fit the handle of any Sad Iron. It never gets hot—**ALWAYS COOL**—instantly applied and self adjustable. Fastens with spring latch and opens with an automatic spring.

It is made on a two part wood frame covered with heavy

duck. The inside is lined with asbestos—a positive non-conductor of heat. When closed on the handle of the iron an extra heavy nickel plated brass shield prevents the heat from striking the hand.

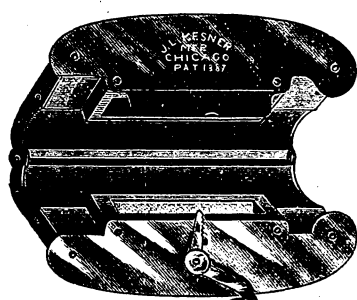
SOLD BY ALL HARDWARE JOBBERS.

If your jobber does not carry them order a sample gross direct from us. No dealer can afford to be without them.

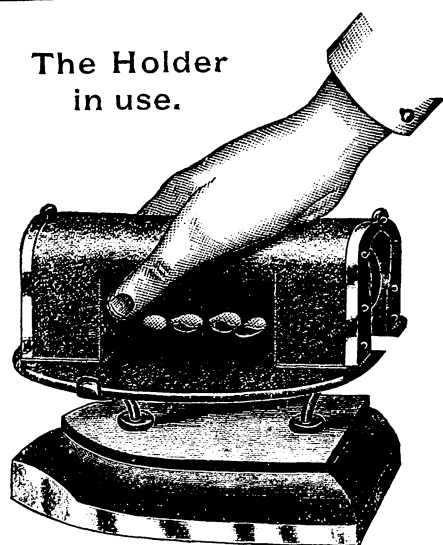
For Circulars, Testimonials and Price-List write the Manufacturers,

J. L. KESNER & CO.,

76-78 E. Illinois Street, CHICAGO, ILL.



Patented Oct. 25th, 1887, and others pending.

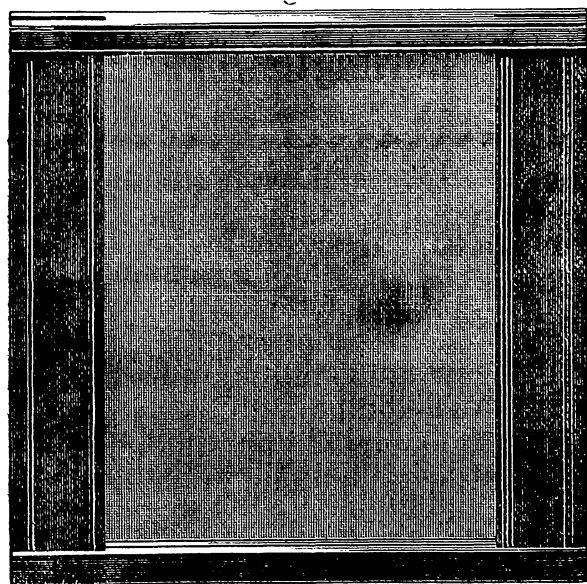


The Holder
in use.

FOR THE RELIEF OF

FLY-BLOWN, MOSQUITO-BITTEN, BUG-PESTERED AMERICA,

2,500,000 PHILLIPS' SCREENS WILL BE IN USE THIS SUMMER.



**Phillips' Screen Doors,
Fancy Screen Doors,
Empire Screen Doors,
Bonanza Window Screens,
Perfection Window Screens,
Extension Window Screens,
Window Screen Frames.**

SCREENS MADE TO ORDER.

THE MOST POPULAR PATTERNS.

**GUARANTEED TO BE WELL MADE, FROM
GOOD MATERIALS.**

Sold by the Best Jobbers.

MADE BY

RELIABLE.

A. J. PHILLIPS & CO., FENTON, MICH.

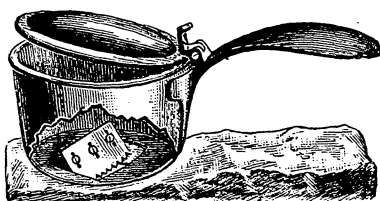
Send for Illustrated Catalogue.

ENTERPRISE M'FG CO. OF PA.,

THIRD AND DAUPHIN STREETS, PHILADELPHIA.

ICE SHREDDER,

TO SHRED OR SHAVE ICE,
For Fruits, Drinks, Oysters and
Clams on the Half Shell,
Olives, Celery, Radishes,
Iced Tea, Sliced
Tomatoes, &c.,
&c., &c.



No. 33, ~~PAINTED~~ TINNED,

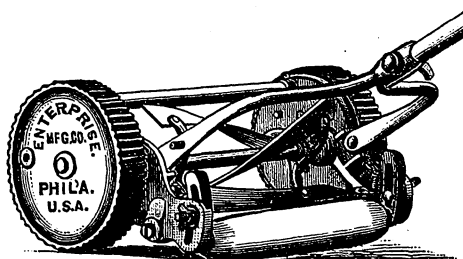
Price, - - per doz., \$7.20.

No. 34, Nickeled,

Price, - - per doz., \$24.00.

LAWN MOWERS,

PAINTED or ~~PAINTED~~ TINNED.



7, 9, 11, 13 and 15 inches.
Simple in Construction.

Easily Adjusted.

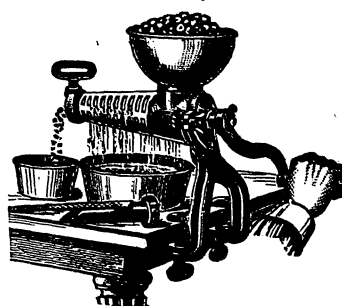
Light Running.

Highly Efficient.

Durable.

FRUIT PRESS

FOR MAKING
Wines, Jellies, Fruit
Butters, &c.



No. 24, FRUIT PRESS,

Price, \$3.00.

No. 28, DRUG PRESS,

Price, \$4.00.

FOR SALE BY THE HARDWARE TRADE. SEND FOR CATALOGUE.

WE ARE STILL "IN IT"

—WITH THE—

EUREKA AND LEADER

Adjustable Window Screens,

—ALSO—

Sticks and Corners for Door and Window Frames.

SEND FOR CIRCULAR AND PRICE-LIST.

QUEEN ANNE SCREEN CO.,

JNO. H. GRAHAM & CO., Genl. Agents,
113 Chambers St., New York.

Burlington, Vermont.

The Richardson Tack Hammer.

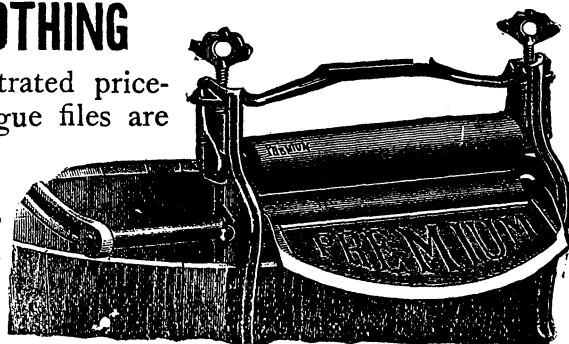


This is a perfectly balanced Hammer with Claw of peculiar construction. When tacks driven closely to base-board are to be removed they can be extracted quickly and without injury to wood-work. They are made in two grades, No. 1 and No. 0. No. 1 grade has a magnetized head, making it unexcelled for ceiling work or for use in places where only one hand can be used to advantage. No. 0 grade is finished in same manner as No. 1, but is not magnetized. We earnestly solicit a trial of this Hammer, and would ask that you write to our nearest agent for prices. Manufactured by SMETHPORT MACHINE COMPANY, Limited, SMETHPORT, PA.

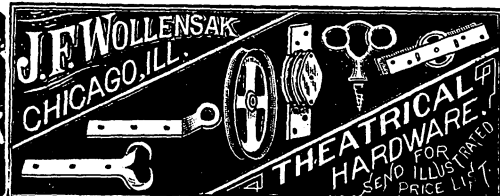
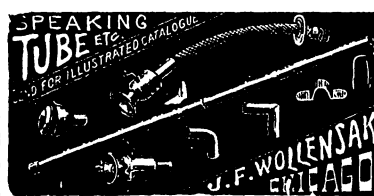
C. H. GURNEY CO., Western Agents, Chicago, Ill.
A. FIELD & CO., New York City Agents.
BUEHLER, BONBRIGHT & CO., Agents, Philadelphia, Pa.

IT COSTS NOTHING

to send for our illustrated price-list, and your catalogue files are incomplete without it. Write to the Factory, Montpelier, Vt., or to our Chicago store, 68 Lake St.

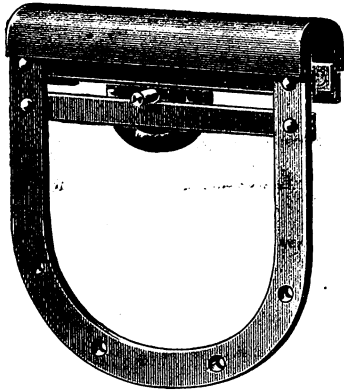


COLBY WRINGER COMPANY.



LANE'S Pat. Steel BARN DOOR HANGER.

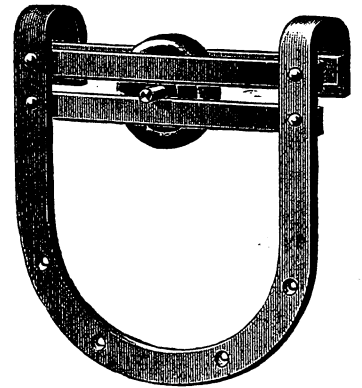
"COVERED."



Nos.	List.	Per doz. pair.	Nos.
11.....	\$15.00.....	1	
11½.....	18.00.....	1½	
12.....	22.00.....	2	
	30.00.....	3	
	36.00.....	4	

Liberal Discount to Trade.

"STANDARD."



POINTS OF EXCELLENCE.

Being of Steel—No Breakage—Axle
Not Running in a Box. No wearing
out in a Life-Time—No Oil Required.
Operates Wonderfully Easy—Never
Screeches—Always in Order.

REMEMBER:

We were the originators of the Lane Barn Door Hangers.
All others of similar shape are but imitations.
Beware of alleged improvements and inferior goods.

Lane's Patent Parlor Door Hanger.

FOR DOUBLE DOORS Each one to slide 4 feet or less,

Price, per set (of 4 Hangers), including 14 feet of Track, Gravity Stops, Striking Plates and Floor Plates.....\$6.00

FOR SINGLE DOORS to slide 4 feet or less.

Price per one-half set (of 2 Hangers), including 8 feet of Track and Fixtures.....\$3.00

LONG DISTANCE HANGERS for double or single doors to slide any distance.

Price, per set (of 4 Hangers), including 14 feet of Track and Fixtures.....\$8.00

Price, per one-half set (of 2 Hangers), including 8 feet of Track and Fixtures.....4 00

Extra Track when ordered, 9 cts. per foot.

JOHN H. GRAHAM & CO., - General Agents,
113 Chambers St., New York.

PURE ALUMINUM COOKING UTENSILS

A REVOLUTION IN COOKING UTENSILS.

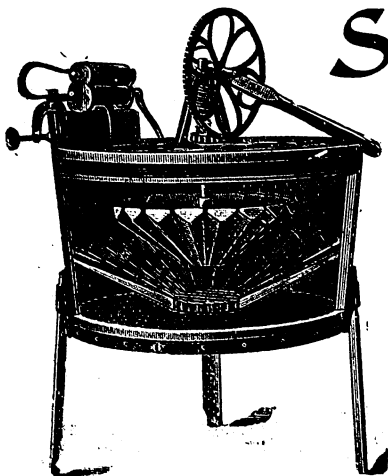
Aluminum utensils do **NOT** Scorch milk, rice, or any farinaceous food.

One 2-Quart Pan, One 4-Quart Pan, One Large Fry Pan, One 13-inch Wash Bowl, Sent to any address for **\$5.00.**

ALL GAUGES OF ALUMINUM SHEET KEPT IN STOCK.

Address

THE ILLINOIS PURE ALUMINUM CO., - Lemont, Ill.



Self Praise

IT IS SAID, IS NO RECOMMENDATION,

But we cannot refrain from
referring to the virtues of

THE WEISELL WASHER

continually. They are made
to wash dirty clothes easily
and without tearing.

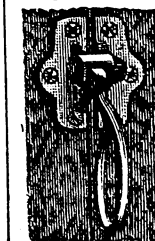
Write for sample machine.

DIETHER & BARROWS,
Ft. Wayne, Ind.

1893 CATALOGUE
JUST OUT
HOLLOW WARE and HARD
WARE SPECIALTIES.

The STUART & PETERSON CO.
PHILADELPHIA, PA., U. S. A.

P. J. Conroy & Co.,
Paschall, PHILADELPHIA.



'CONROY'
Refrigerator Door
Fasteners

Have rapidly supplanted all
others
Refrigerator Trimmings.

Pat. Dec. 15 85.

"PURITAN"

COOKERS, COFFEE POTS AND
OTHER SPECIALTIES.



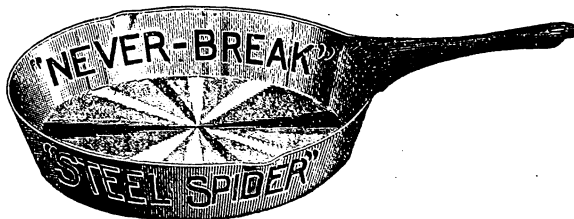
Cooks Quicker than any other
Porcelain Rice Boiler made.

"NEVER-BREAK"

Wrought Steel Spiders

Wrought Steel Griddles, Kettles, Stew Pans, Stew Pots, Maslins,
Scotch Bowls, Hotel Sauce Pans, &c.

MIRROR POLISHED—TINNED—PORCELAINED.



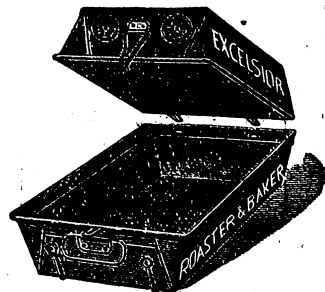
"MIRROR POLISH," the only Perfect Plain Steel Finish

SOLE MANUFACTURERS

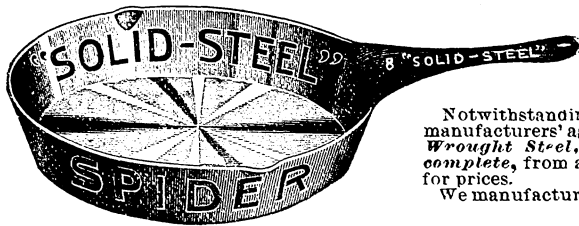
THE BRONSON SUPPLY COMPANY,
CLEVELAND AND NEW YORK

"EXCELSIOR"

Roasting and Baking Pan.
PLANISHED and PLAIN STEEL.

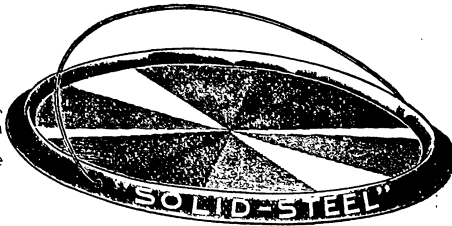


"SOLID-STEEL" SEAMLESS HOLLOW WARE.



BRILLIANT FINISH.

Notwithstanding the claims made by some
manufacturers' agents, our spiders are made from
Wrought Steel, Without Seams or Rivets
complete, from a single piece of metal. Write
for prices.
We manufacture our own goods.



No Seams, no Rivets in "Solid-Steel" Ware.

Made either with Balls or Solid Handles.

The Cleveland Stamping & Tool Co., Cleveland, O.

We are in shape to figure on light and heavy stamping, and in addition to the above we build Dies and Stamping Machinery.

BUSINESS ESTABLISHED
1798.

INCORPORATED
1891.

JOS. F. McCOY CO.

26 Warren St., New York,

—Importers and Dealers in—

HARDWARE, CUTLERY, TOOLS

—AND—

RAILWAY SPECIALTIES.

SOLE AGENTS FOR

Monarch Cutlery Co., { Pocket Cutlery, Scis-
Irving Cutlery Co., { sors, Tools, etc.
George Butler & Co., { Razors, Table Cutlery
etc.
Warrington Shear Co., { Warranted Shears
Sissors, etc.
Peugeot Frères, { Celebrated "Lion" Brand
Saws, Tools, etc.
Gueutal & Sons, { Celebrated French Plyer
and Jewelers' Tools.
Coates Clipper Mfg. Co., { Patent Horse and
Hair Clippers.
Tangyes, Limited, { Hydraulic Jacks, Blocks
etc.
Wm. Eades, Son & Co., { Patent Differential
Pulley Blocks.
Weston's Patent Ratchet Drills.
Weiller & Co., Brass Wire Cloth.

Headquarters for

Empire Knife Co. and La Belle Cutlery Co.

HARVARD TROUSERS STRETCHER.

Patent Applied for.



Will restore pant legs to perfect shape
creased and pressed in the latest style,
by allowing them to remain in over
night. It exerts an outward pressure,
and removes all wrinkles and bags at
the knees.

(DIRECTIONS.)

Dampen the cloth after inserting the
stretchers.

Made from steel wire, plated.

Price Per Pair, \$1.00.

Sample Pair to Dealers, 50c

GEO. H. GREGORY,

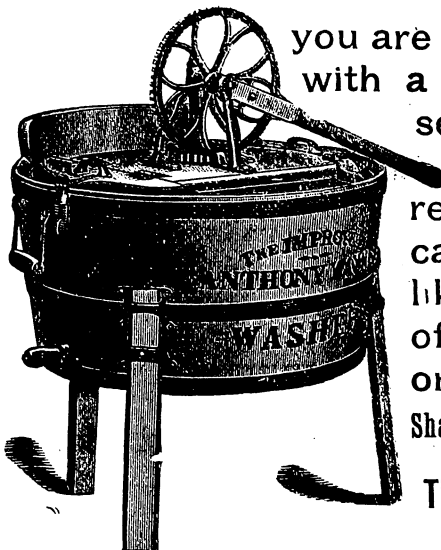
35 Arch Street,

Boston, Mass.

Telephones, Their Construction and Fitting. A
Practical Treatise on the Fitting Up and Main-
tenance of Telephones and the Auxiliary Appa-
tus. By F. C. ALLSOP. 191 pages, cloth...\$2.00

For sale by DAVID WILLIAMS, 96-102 Reade st., N.Y.

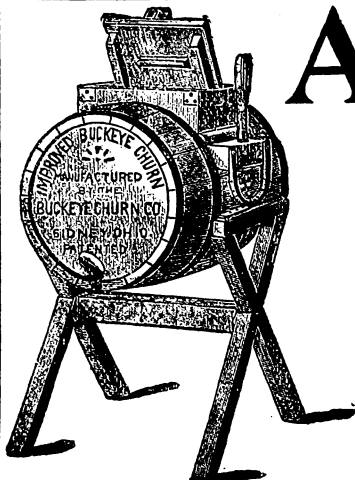
SOMETIMES



you are persuaded to stock up
with a washing machine re-
sembling the Anthony
Wayne, but there the
resemblance ends, be-
cause there are none just
like it, either in character
of the work done, price
or quality.

Shall We Send You Catalogue? Costs Nothing.

THE ANTHONY WAYNE MFG. CO.,
FORT WAYNE, IND.



A Buckeye

Churn is the best for making butter quick,
cleanly and rapidly. There are others,
but none its equal. A child delights in
operating it. Order a sample. See if it
don't sell quick. Our Queen Washing
Machine is another excellent household
adjunct, cheap but good. Agencies given.
Write

BUCKEYE CHURN COMPANY,
SIDNEY, OHIO.

THE "SURPRISE" SELF-SETTING RAT TRAP. PATENTED.
BEST AND SIMPLEST TRAP IN THE WORLD.



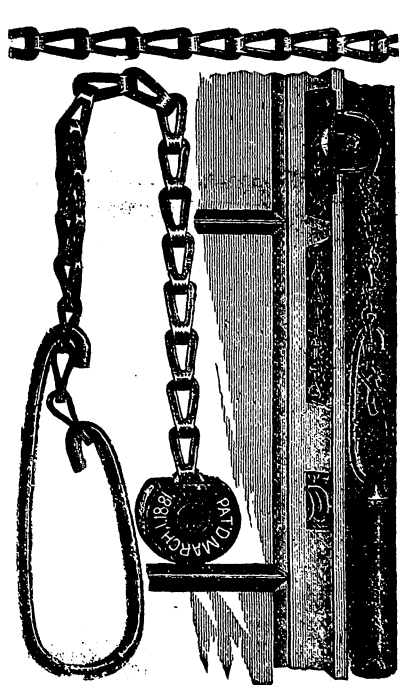
A Trap For Trade.

AUTOMATICALLY SET WITH THE HANDS OR FOOT.
Catches Dollars for the Seller and Rats for the Buyer.
Don't handle infringements.

The
SUN MANUFACTURING CO.,
SUCCESSORS TO
THE JNO. M. WADDELL MFG. CO.,
GREENFIELD, O.

THE SMITH & EGGE MFG. CO.

BRIDGEPORT, CONN.



THE GIANT PAD LOCK.

Centennial Award. "Superior in Every Respect"
This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."



WATERPROOFED through SOLID. Light, CLEANLY, Handsome, DURABLE. Cheap as a GOOD ARTICLE can be made. ORNAMENTAL as well as USEFUL. Sold DIRECT TO THE TRADE. In this ARTISTIC age no dealer can afford to be without DECORATED FLAX FIBER WARE, bearing above trade mark and made only by above Company.

Grennan's Sash Pulley Marker for Common Sense Sash Pulleys.

Will mark in ten minutes what would take five hours to do the old way, saving the price of it the first time used.

It always marks the centers accurately, so the pulleys are sure to fit and saving a great deal of refitting. They are simple, durable, handy, and sell at sight.



Throop's Sash-Weight Fastener

Saves 2 cents a window in cost of material, saves time in putting on and makes a neater job than tying knots. Send for circulars and prices

J. W. Skelly & Son, - BRISTOL, CT.

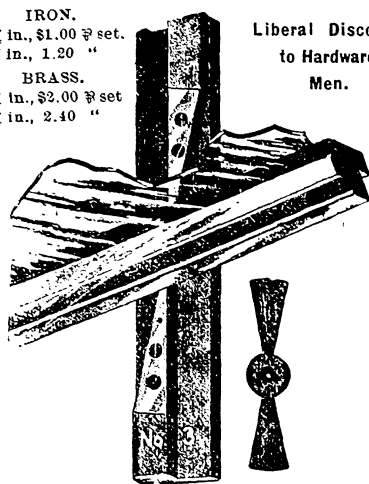
HOWARTH REVERSIBLE SASH AND

SASH CENTRE CO.,

DETROIT, MICH.

IRON.
1 3/4 in., \$1.00 per set.
2 1/4 in., 1.20 "
BRASS.
1 3/4 in., \$2.00 per set
2 1/4 in., 2.40 "

Liberal Discount
to Hardware
Men.



This sash centre is made of malleable iron or brass, it has the displacement between rebates, is easy to apply, and allows the sash to be turned outside in for cleaning. Can be used top and bottom or sides.

READING

Hardware Company,

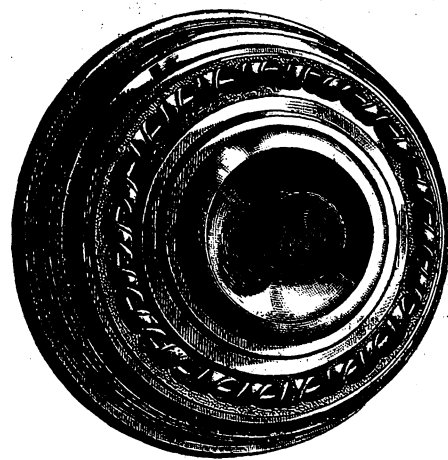
MANUFACTURERS OF

FINE BRONZE HARDWARE.

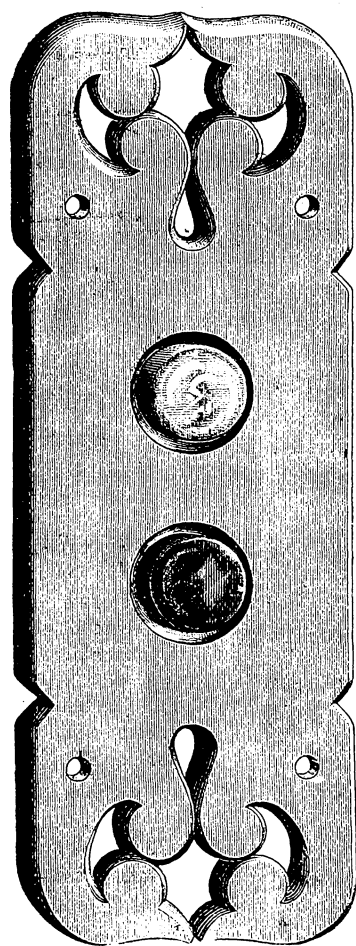
ARTISTIC DESIGNS

In House Trimmings,

In a Great Variety of

ELEGANT FINISHES.

RIBBON PATTERN.



COLONIAL PATTERN.

"VASSAR" CYLINDER : LOCKS,

FOR

FRONT DOORS,
VESTIBULE DOORS,
OFFICE DOORS,
STORE DOORS, Etc.

"VASSAR"

Rim Night Latches,

AND

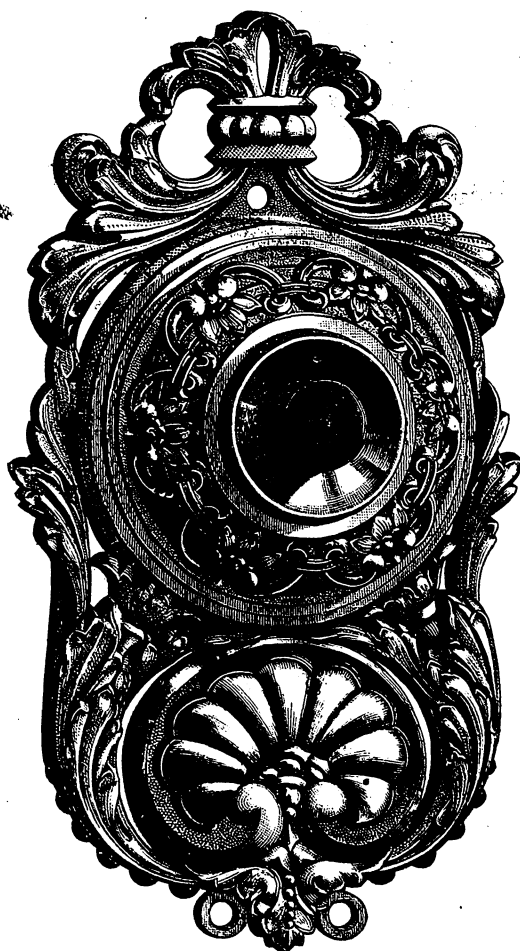
"VASSAR"

Rim Dead Locks,

WITH

Patent Self-Adjusting
Connecting Spindle,

ARE

THE BEST MADE.

LA GRANDE DESIGN.

BUILDERS' ^{AND} 
SHELF HARDWARE,
And All Kinds of
Rim and Mortise Locks.

Catalogues and Prices furnished on application.

WAREHOUSES :

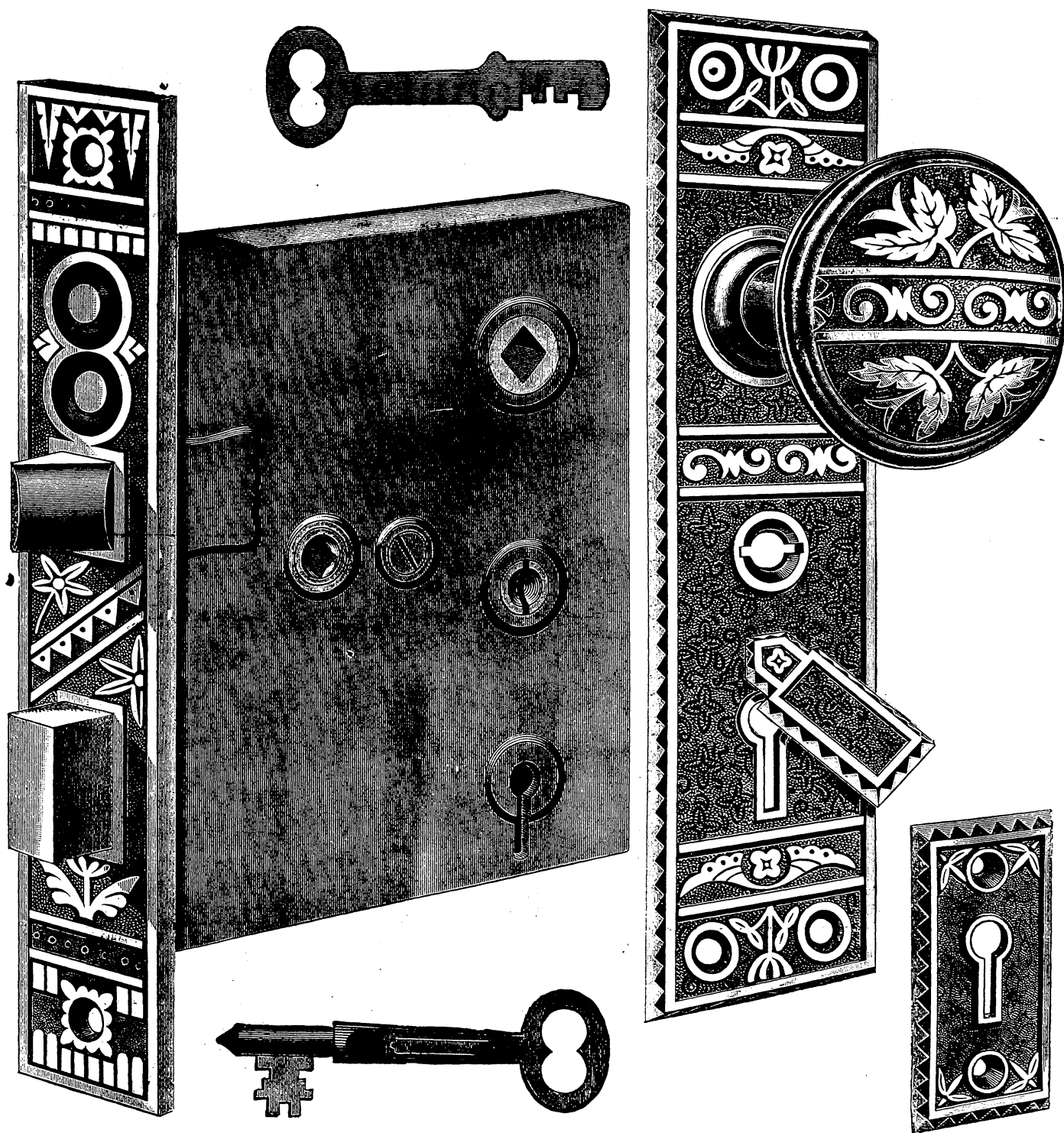
NEW YORK,
81 Reade St.

PHILADELPHIA,
514 Commerce St.

CHICAGO,
73 Wabash Ave.

FACTORIES AND MAIN OFFICE :

Reading Hardware Co., Reading, Pa.



BRITTAN, GRAHAM & MATHES.
FRONT DOOR SETS,

— WITH —

Flat Steel Keys to Night Works.

PLAIN AND ORNAMENTAL.

THE BEST LOW PRICED SET IN THE MARKET.

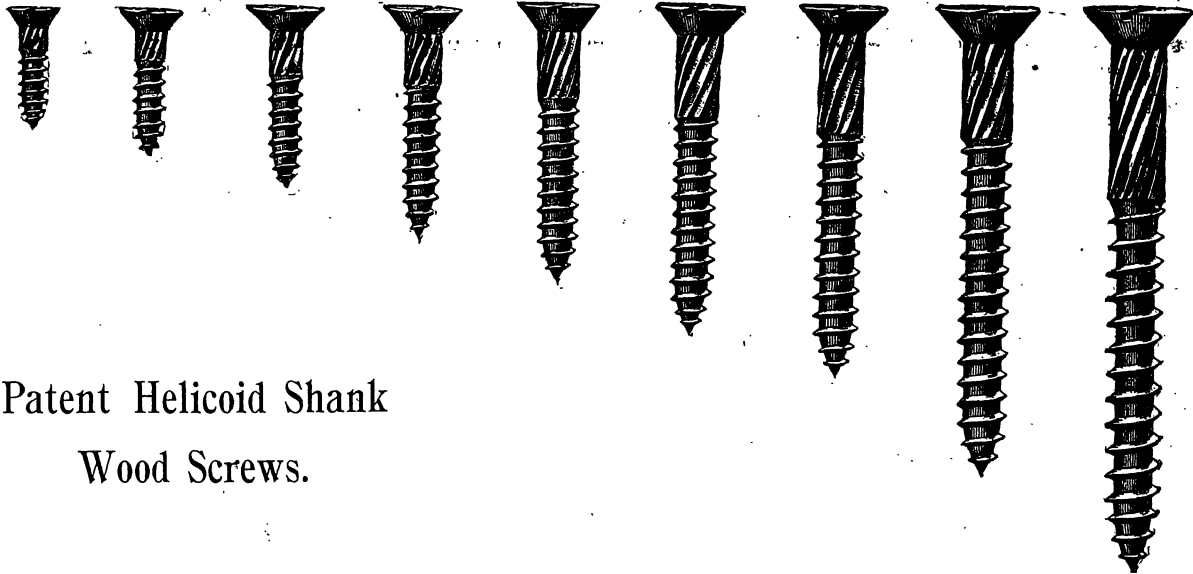
Write for Prices and Catalogue to **PITTSBURGH, PA.**

TEMPORA MUTANTUR ET NOS MUTAMUR IN ILLIS.

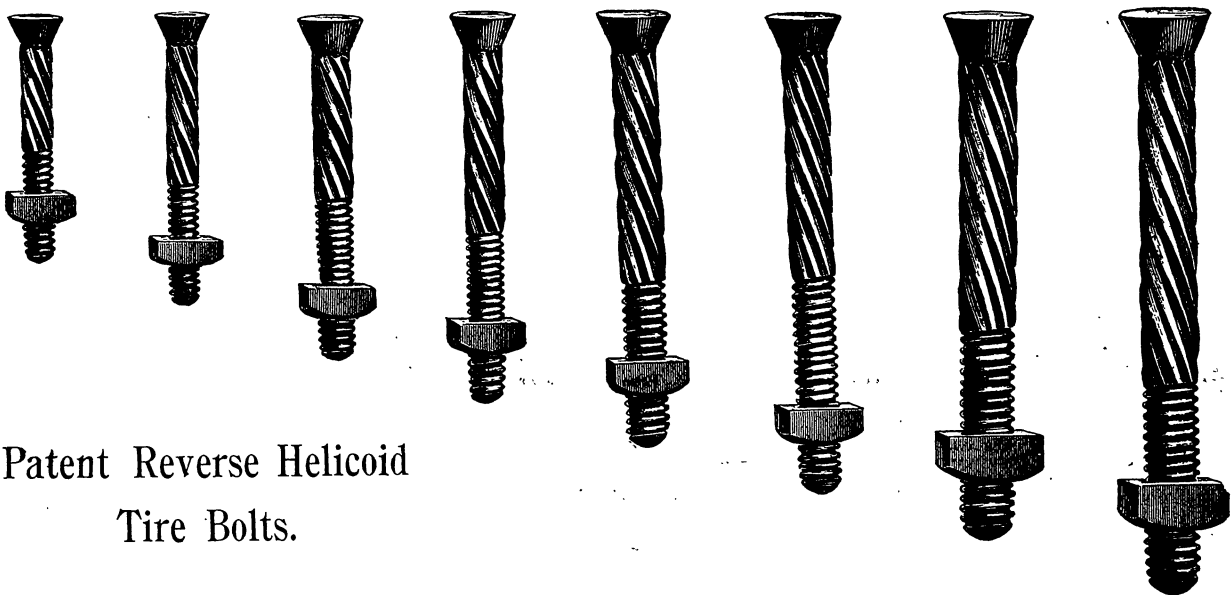
Russell & Erwin Manufacturing Co.,

New Britain, Conn., New York, Philadelphia, Baltimore, London.

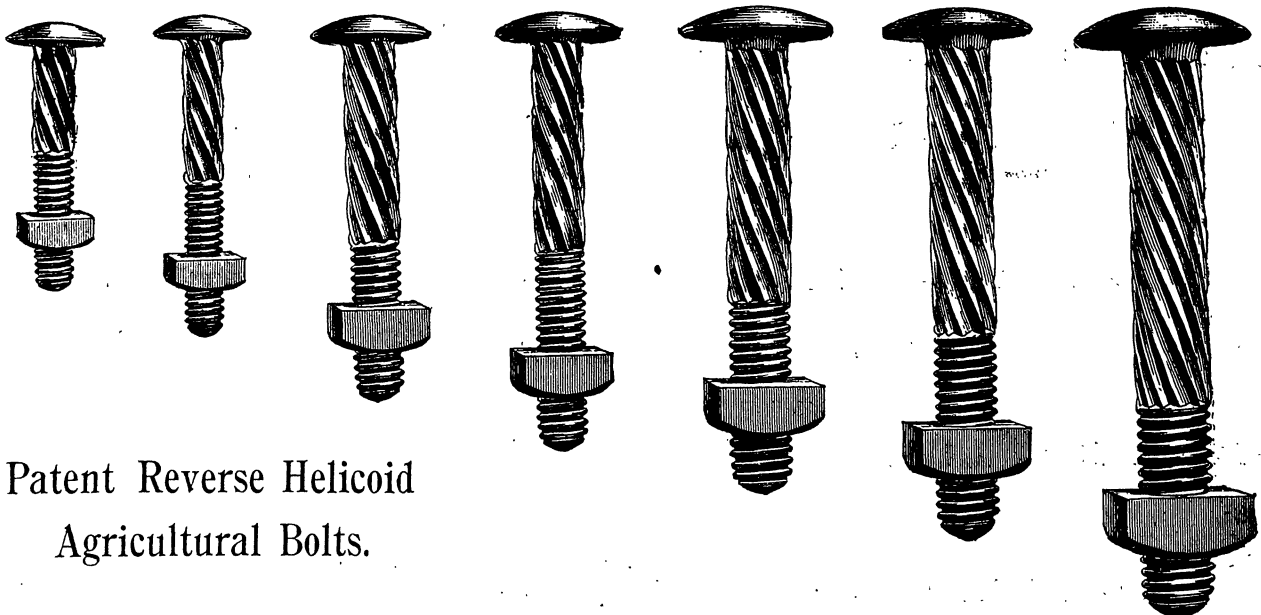
SOLE MANUFACTURERS.



Patent Helicoid Shank
Wood Screws.



Patent Reverse Helicoid
Tire Bolts.



Patent Reverse Helicoid
Agricultural Bolts.

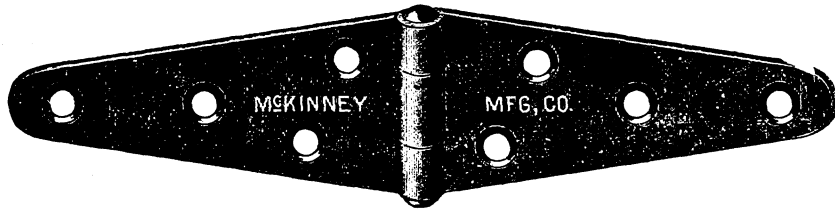
McKinney Mfg. Co., Allegheny, Penn.

— WE MANUFACTURE —

STEEL HINGES AND BUTTS

EXCLUSIVELY.

SEND FOR
LIST.



ORDERS FILLED
ON SIGHT.

"NONE BETTER."

Read what People Think
of the

"NOISELESS" STORE LADDER

— MANUFACTURED BY —

M. CROISSANT, Albany, N. Y.

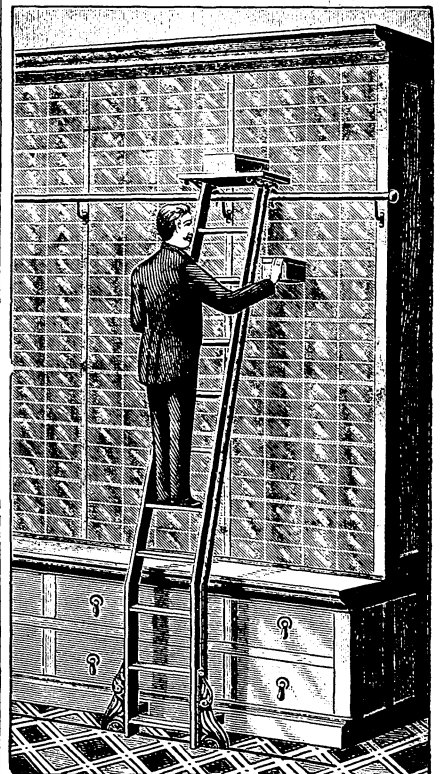
CASNOVIA, MICH., March 24th, 1893.
M. CROISSANT, Albany, N. Y.

DEAR SIR: We have received track and ladder ordered from you and have just got it in position, and must say that it is the nicest thing of the kind we have ever seen and can heartily recommend it to others in need of a store ladder.

Inclosed find our check for \$13.42 in payment for same, less 2 per cent.

Yours truly, A. NORRIS & SON.

The Bicycle Step Ladder.



No other Ladder Service can approach the "Bicycle" in ease and convenience of operation. Compared with others they work like a bicycle beside a lumber wagon.

Can be applied to any kind of shelving made. See this space next week for other styles. Send for Illustrated Catalogue and prices to
THE BICYCLE STEP LADDER CO.,
184 & 186 Clark St., Chicago, Ill.

HORACE E. BRITTON, Stoughton, Mass., Manufacturer of the **HENRY'S PATENT COMBINATION HAFT,**



AND OTHER TOOL SPECIALTIES.

The Combination Haft contains six Brad-Awls, one Chisel, Screw Driver, Diamond Point Awl, Marking Awl, Tack Puller and Reamer. Send for Circular and Prices.

Full Set Sent Post-paid on receipt of \$1.00. (No stamps.)

THE ART OF SELLING.

By F. B. GODDARD.

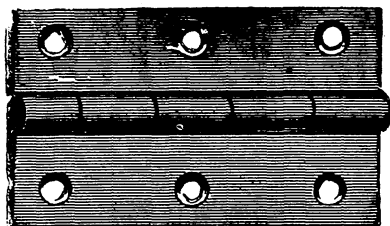
12mo. Flexible Cloth, 50 Cents.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse, and tells how he masters men: but beyond this, the work embraces much information which will be instructive and useful to all classes of business men. Besides suggestions to buyers, it contains chapters on "Changes in Business Conditions and Methods," "Salesmen's Compensation," "Retail Merchants and Salesmen," "Saleswomen," "How to Read Character," with a collection of clearly and tersely put important Legal Principles and Decisions Governing Sales. Sent, post-paid, upon receipt of price, by

DAVID WILLIAMS, Publisher and Bookseller, 96-102 Read St., N. Y.

BUY CURLEY'S ONLY.
(PAT. MAR. 22, 84)
THE ONLY ONE THAT
WILL DRAW THE CORK
WITHOUT PULLING.
SEND 50 Cts. FOR SAMPLE. YOU TURN THE HANDLE THE EMPIRE PORTABLE FORGE COMPANY.
LANSINGBURGH, N. Y. U.S.A.

N. Y. Office, 108 Chambers St., W. H. QUINN, Manager.



Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York.

MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.**

MONEY, TIME and LABOR SAVED

When you build if you will
use our Steel Frame Sash
Balance.

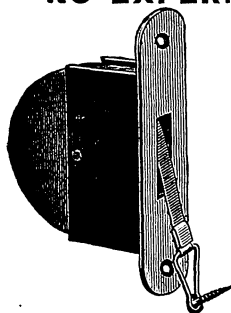
NO EXPERIMENTING.

We have made
them 7 years. They
require no box frames

Applied as easily
as a common pulley.

Costs less money
than weights and cord

We guarantee
them 10 years.



Ask your Hardware Dealer for the Pull-
man Steel Frame. Don't accept imitations.

PULLMAN SASH BALANCE CO., Rochester, N. Y.
New York Office, 142 Chambers St.

COMMON SENSE SASH BALANCE.



The Best and most Practical
substitute for weights invented.
The most Durable, the Cheap-
est and best device for all
ordinary windows. Balances
when in position are out of
sight. No rivets, bolts or
screws are used in putting it
together, so that nothing can
get out of order or need repair-
ing. No cutting, boring or
marring the sash, as the Bal-
ances are let into the jamb.

Manufacturers of Sash Balances, Sash
Locks, Sash Lifts, Monitor
Sash Irons.

STEWART & BAKER,

107 State Street, Rochester, N. Y.

No more **Slamming!**
...Doors!

Our Combination

**Door Check
Lock and
Bumpers**

Holds
door
in
any
position

For sale by all Jobbers. Write
for Circulars.

Unity Door Check Co.,
81 Dearborn St., Chicago, Ill.



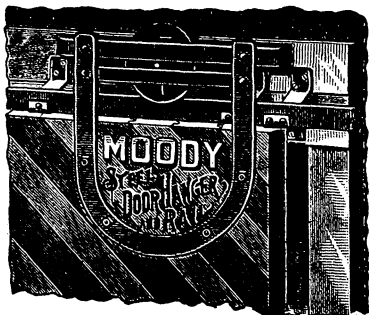
HUGUNIN'S PAT. SCREW SASH BALANCES

"The Old Reliable." Best, Cheapest.

Sash work as with weights. Prices: 85c., 80c. and
\$1.00 per set of four. Liberal discounts.

R. B. HUGUNIN W F MFG. CO., Hartford, Conn.

VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.

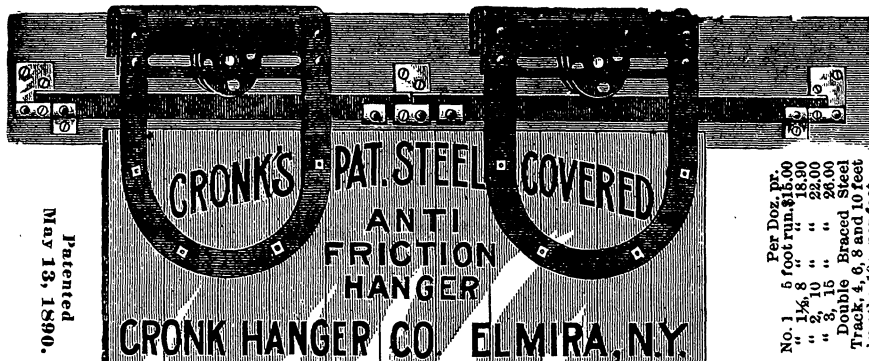


Showing one-half set of hangers attached
to door.



The Only Bracing Bracket Made.

HANGERS.	PRICE-LIST.	Per Doz. prs.
No. 5, to run 6 feet, 3 1/4 in. wheel,	-	\$10.00
No. 6, to run 10 feet, 4 1/4 in. wheel,	-	15.00
No. 7, to run 15 feet, 5 1/4 in. wheel,	-	22.00
RAIL, per foot.....		6 1/2 cents.



We are the original makers of steel covered hangers and all others are imitations.
Beware of infringements, as we shall protect our rights.

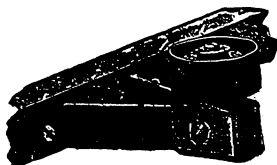
In our Steel Covered Hangers we have all the desirable features of the Best Hangers in the market, and
with that we combine the cover for wheels SO NO ICE OR SNOW can reach the wheels, and making this
cover as we do, we stiffen it so it is the strongest Hanger in the market, and we believe it is just perfect.
Would be glad to have you try a small order and satisfy yourself.

Double-Braced Steel Rail.

PATENTED JUNE 12, 1888.

This rail being double-braced and double-riveted is the strongest rail in the market. Being braced both
ways it will not sag. The joint is made so it is perfectly solid. It comes complete and ready for use, requir-
ing only screws and screw driver for any man or boy to put it up in short order. It can be used for any
grooved wheel Hanger, and a heavy door will not make it spring or tremble. Guaranteed to hold a door
weighing 2,000 pounds, and used in connection with our Anti-Friction Hanger will work perfectly on large or
small doors.

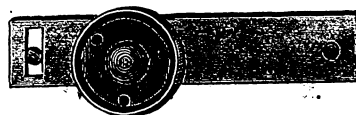
Cronk's Adjustable Stay Roller.



Made of wrought steel strap; cast block with slot
adjusted by loosening bolt.

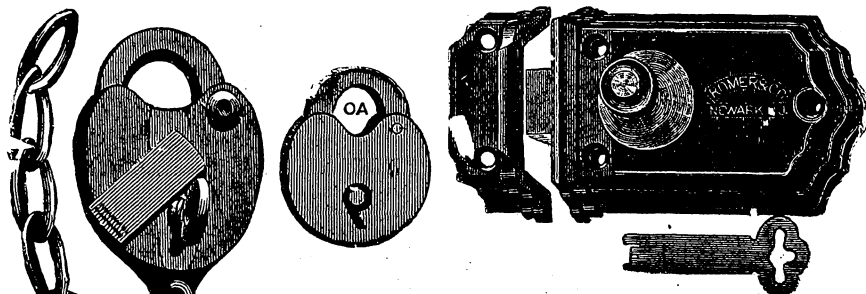
Pacific Coast Agents. CHAS. L. PIERCE & CO., San Francisco, Cal.

Cronk's Inside Adjustable Stay.



Is cheap, simple and durable, and much better than
a cleat nailed on the floor for this avoids all friction
and leaves no place for dirt to accumulate. \$2.00 per
doz. No inside door can be properly hung without
this stay.

ROMER & COMPANY, Manufacturers of PATENT JAIL LOCKS, BRASS and IRON PADLOCKS,



Adjustable Door Knobs and Trimmings,
Front Door Handles.

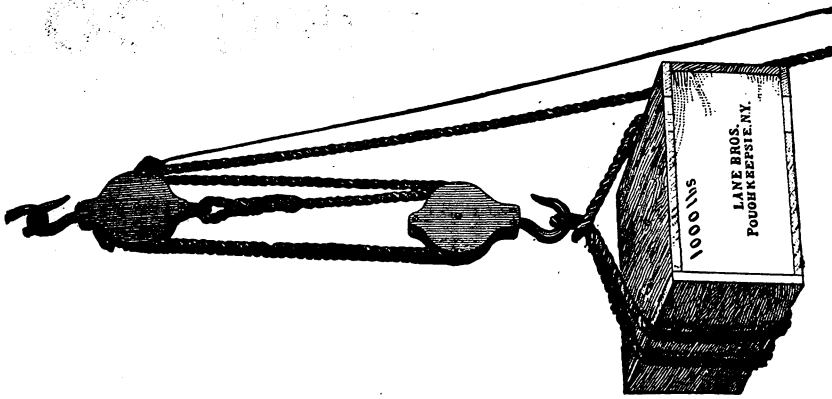
Patent Horizontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.
275, 277 and 279 Passaic St., near Erie and D. L. & W. R. R. Depots, Newark, N. J

THE CLARK MFG. CO.,

Blind Hinges, Cate Hinges, Door Butts,
And other HARDWARE SPECIALTIES

BUFFALO N. Y



LANE'S SELF-LOCKING TACKLEBLOCKS,

Anti-Friction Steel Bushings,

Holds the load at any point, and always sure.

SEND FOR CIRCULAR.

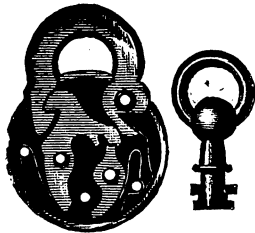
For sale by the Hardware trade.

—MANUFACTURED BY—

LANE BROS.
POUGHKEEPSIE, N. Y.

PATENT PERFECTION PADLOCK

Eight Tumblers. Key Turning Both Ways.



Sizes, $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches; of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also, $\frac{1}{4}$ and $\frac{3}{8}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world. Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

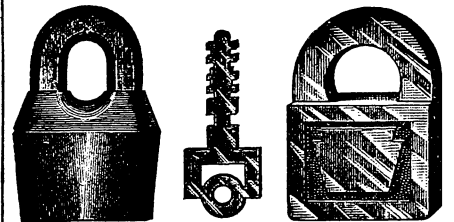
Send for Price Lists and Circulars.

KEYSTONE LOCK WORKS,

—Established 1879.—

E. T. FRAM, Lancaster, Pa., U. S. A.

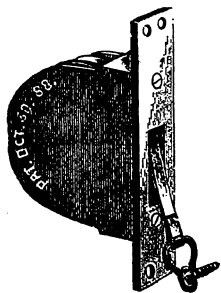
MANUFACTURER OF



Patent Inter-Locking Tumbler Scandinavian or Jail PADLOCKS, in 56 grades and sizes. Key and Self-Locking. Brass, Bronze, Steel and Malleable Iron. Red, Black, Bower-Barff and Bright Brown finish. Also a full line of fine flat padlocks in Bronze and Steel. All fully described and illustrated in our new catalogue, furnished free to the trade.

SURPLESS, DUNN & ALDER,

General Agents, 97 Chambers St. New York.



Merit Always Wins. THE CALDWELL SASH BALANCE

Has been the standard for five years.
Write for our new catalogue of Hardware Specialties.

CALDWELL MFG. CO., Rochester, N. Y.

READING HARDWARE CO., Agents.

81 Reade St., New York.
514 Commerce St., Philadelphia.
73 Wabash Ave., Chicago.

THE HANDSOMEST AND BEST JAIL PADLOCKS IN THE MARKET.

Cast Bronze.
2 Nickel Plated Steel Keys each.
4 Honest Tumblers each.



The Parts are MACHINE MADE, accurately fitted, durable and secure. Liberal discounts to the trade render these the cheapest fine Jail Padlocks in the market.
For sale by the best Jobbing Houses and by all five Retailers.

No.	Weight, $\frac{1}{4}$ lb.	2-Keyed, 4 Tumblers,	PRICE, PER DOZEN.
99,	$\frac{1}{4}$	- - -	\$6.00
999,	$\frac{1}{2}$	- - -	8.00
		For Chain attached, add	2.00

MILLER LOCK CO., SOLE MANUFACTURERS, FRANKFORD, PHILADELPHIA, PA.

Crown and Giant Sash Cord and Bell Cord. Braided and Twisted Picture Wire Spool Wire, Clothes Lines, Ventilator Cords, Garden Lines, Chalk Lines, Annunciator Wire.

✻ Send for Catalogue, Samples, Prices. ✻

Bright Wire Goods, Picture Nails, Knobs, Hooks, Chain, Clothes Line Pulleys, etc.

—MANUFACTURED BY—

OSSAWAN MILLS CO., Norwich, Conn.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

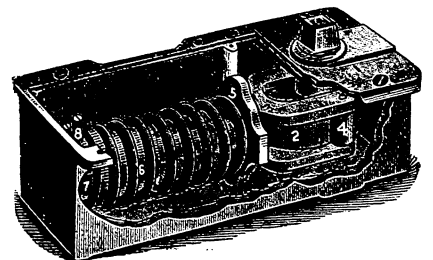
MANUFACTURED ONLY BY

"THOMAS MORTON"

65 Elizabeth Street,

Write for Prices.

NEW YORK.



CHECKING SPRING HINGES FOR SWING DOORS.

Applied in floor under door. They close the door gently, without noise or violence and stop it at once at the centre. Doors cannot sag, springs do not break or set.

J. BARDSLEY, 149 & 151 Baxter St., New York.

Illustrated Price-List on Application.

SASH WEIGHTS

E. E. BROWN & CO.,

McKean and Meadow Sts.,

PHILADELPHIA PA.

AMERICAN CURRY COMB CO.,

TROY, N. Y., U. S. A.

MANUFACTURERS OF ALL KINDS OF

CURRY COMBS IN STEEL, BRASS AND IRON.

VERY BEST QUALITY AND FINISH.

New York Sales-
rooms with

FULLER BROS., No. 33 Chambers St.

San Francisco, Cal., Salesroom with

The GEO. F. EBERHARD CO., 23 Davis St.

Portland, Oregon, Salesroom with

The GEO. F. EBERHARD CO., 23 Front St.

Illustrated Catalogue and Prices to Jobbers on Application.



FROST'S ANTI-RATTLE

Pat. Jan. 20, 1880.

Out One-half Size.

Sample pair sent to any hardware or saddlery firm by red-dressing

The Frost Thill Spring Co.

Boston, Mass.

THE WILCOX & HOWE COMPANY,

BIRMINGHAM, CONN.,

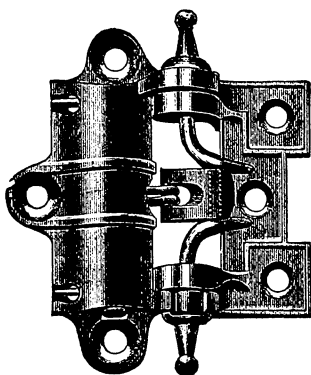
MANUFACTURERS OF

**A Full Line of Carriage Hardware
ALSO SPECIAL FORGINGS.**

Estimates cheerfully given. Send for Catalogue

NEW IDEA SPRING HINGE

Holds the door strongest when closed.



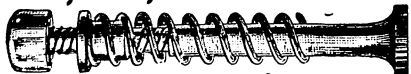
Resistance gradually decreases in opening

and increases in closing the door.
A covered (patented) hold-back Spring Hinge. Full particulars, free Sample and Prices by mentioning this paper.

STOVER MANUFACTURING CO.,

145 River St., Freeport, Ill.

Motley's Adjustable Sash Holder



Patented Dec. 13, 1892.

FOR WINDOWS, NEW OR OLD.

In Buildings, Cars, Steamboats, Carriages, etc.
Also for Window Screens and Sliding Blinds.

Agents Wanted Everywhere.

Send for Descriptive Circular.

PETER MOTLEY,

750 and 752 S. Broad St., Philadelphia, Pa.

Porcelain Lined Lemon Squeezers



Best Common Mouse Traps, Steak Hammers,
Boot Jacks, Lap Boards, Beacon Hill Pat. Mouse
Traps, Mallets, Bung Starters, Hand Screws.

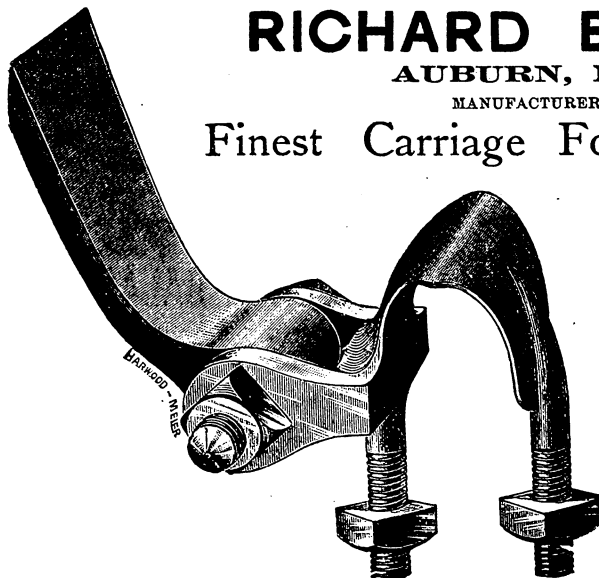
Ripley Mfg. Co., Unionville Conn

RICHARD ECCLES,

AUBURN, N. Y.,

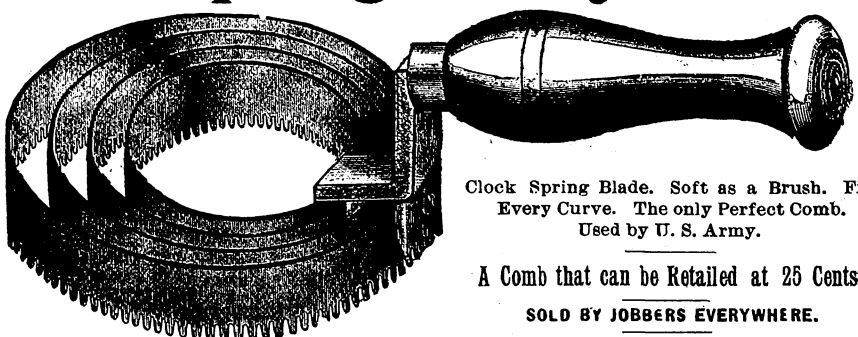
MANUFACTURER OF

**Finest Carriage Forgings, Coup-
lings, Clips,
King Bolts,
Fifth Wheels,
&c. Manufacture a full line.
Special Drop
Forgings.**



Send for Catalogue.

The Spring Curry Comb.



Clock Spring Blade. Soft as a Brush. Fits
Every Curve. The only Perfect Comb.
Used by U. S. Army.

A Comb that can be Retailed at 25 Cents.

SENT BY JOBBERS EVERYWHERE.

Manufactured by the

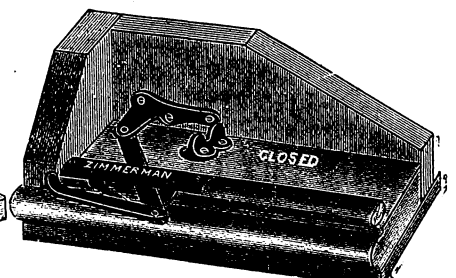
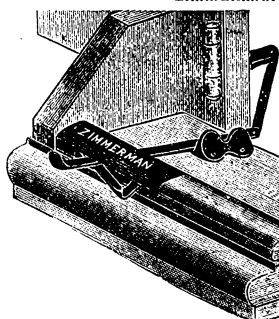
SPRING CURRY COMB CO.,

117 to 119 S. Lafayette St., SOUTH BEND, IND.

ZIMMERMAN'S NEW AUTOMATIC INSIDE SHUTTER WORKER.

Adopted by the Leading Architects of the Country.

Beware of
Infringement.



FOR SALE BY

TYSON & ZIMMERMAN,
W. H. JACOBUS,
SARGENT & CO.,
BIDDLE HDW. CO.,
W. H. COLE & SONS,
C. VONNEGUT,

FREDERICK, MD.
NEW YORK.

PHILADELPHIA.
BALTIMORE.
INDIANAPOLIS.

SIMMONS HDW. CO.,

JOS. WOODWELL & CO.,

J. B. SCHROEDER & CO.,

ORR & LOCKETT HDW. CO.,

W. BINGHAM CO.,

W. B. BELKNAP & CO.,

AUSTIN & EDDY,

ST. LOUIS.

PITTSBURGH.

CINCINNATI.

CHICAGO.

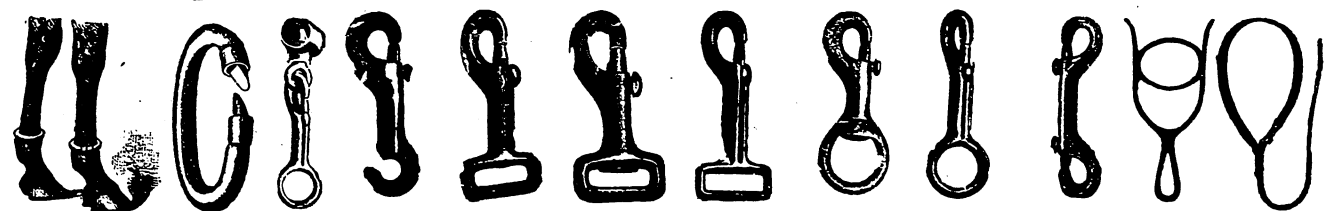
CLEVELAND.

LOUISVILLE.

BOSTON.

COVERT MFG. CO.

West Troy, N. Y.



—THIS IS THE—
Great Covert Snap



The Best and Cheapest, First-Class Snap in the Market.

COVERT'S CELEBRATED HARNESS SNAPS, CHAIN GOODS, ROPE AND WEB GOODS ARE SOLD BY ALL LEADING JOBBERS AT MANUFACTURERS' PRICES.

COVERT MFG. CO.,

WEST TROY, N. Y.

SCRANTON FORGING CO.,

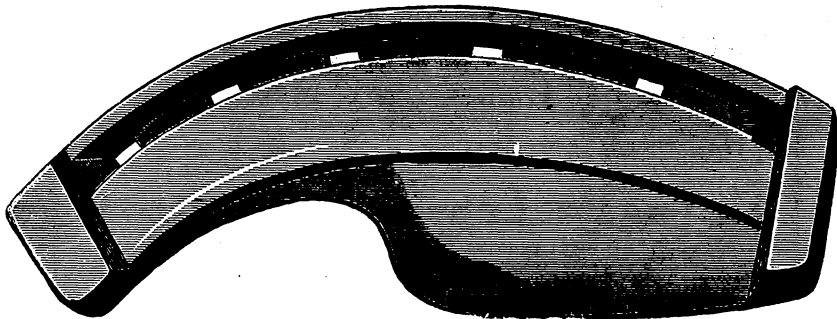
SCRANTON, PA.

CARRIAGE HARDWARE AND SPECIAL DROP FORGINGS.

FORGED

OX

SHOES.



Made under Deeble's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.

Mount Carmel Steel Toe Calk Ox Shoes.

The Best and Cheapest in the World.



Blunt Calk. Seven Sizes.

Warranted
to outwear
any shoe made.

WRITE FOR PRICES.



Sharp Calk. Six Sizes.

Walter W. Woodruff & Sons, Mount Carmel, Conn., U. S. A.

BURDEN'S HORSE SHOES.

"Burden Best"

Iron.

Boiler Rivets.

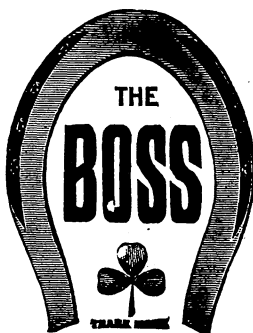
THE BURDEN IRON CO.

TROY, N. Y.

Standard Horse Shoe Co.,
Manufacturers of
HORSE AND MULE SHOES.

LEEDS, ROBINSON & CO., General Agents,

75 North Street, Boston, Mass.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

BRYDEN HORSE SHOE CO.,
CATASAUQUA, PA.

RHODE ISLAND PERKINS HORSE SHOE CO.,

MANUFACTURERS OF

Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

Works at Valley Falls, R. I.

Office, 31 Exchange Place, Providence, R. I.

F. W. CARPENTER, Pres.,

C. H. PERKINS, Gen. Manager,

R. W. COMSTOCK, Sec'y,

J. C. McCARTY & CO., Agents

97 Chambers Street, New York.

THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

DIAMOND STATE IRON CO.
WILMINGTON, DELAWARE.

Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blank Nuts, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

PHILADELPHIA OFFICE,
208 So. Fourth St.

{ Correspondence invited }

NEW YORK OFFICE
11 Pine St.

H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

Send for Price and Illustrated List of

CHAMPLAIN

Manufactured by the NATIONAL HORSE NAIL CO.,
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

J. C. McCARTY & CO., Agents. New York.



Elegant Iron.
Beautiful Shape.

HORSE SHOES,
Light, Medium and Heavy.
MULE SHOES,
Light, Medium and Heavy.

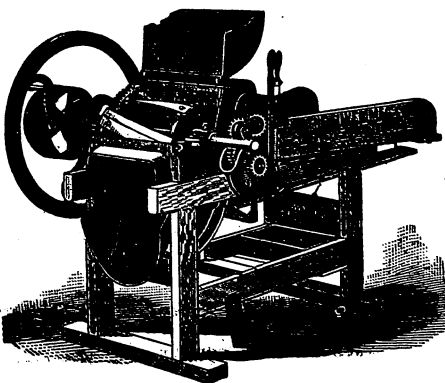
Illustrated booklet and prices to all
parts of the world on application.

OLD DOMINION IRON AND NAIL WORKS CO.,

ARTHUR B. CLARKE, President.

Chicago Office, 45 La Salle St.


Richmond, Va., U. S. A.



THE "OHIO" Feed and
Ensilage Cutters and Car-
riers are the best.

By reason of wide open throat
and improved feeding device
(being full width of cutting sur-
face, all sizes), our machines
have greater capacity than others.

THE SILVER MFG. CO. Salem, O.



P. F. BURKE, C. F. DEWICK & CO.
Successor to
Manufacturer of
PATENT STEEL
(Blunt and Sharp)
TOE-CALKS.
—ALSO—
BURKE'S IMPROVED
HORSESHOERS'
FOOT VICE.
Send for Circulars.
360 Dorchester Av.
BOSTON, MASS.

Successor to
C. F. DEWICK & CO.
Die for Welding
Sharp Calks.

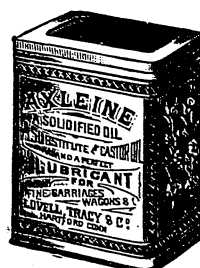
PHOENIX HORSE SHOES.

PHOENIX HORSE SHOE CO.

POUGHKEEPSIE, N. Y.

New York Office, No. 66 Reade Street.

AXLEINE

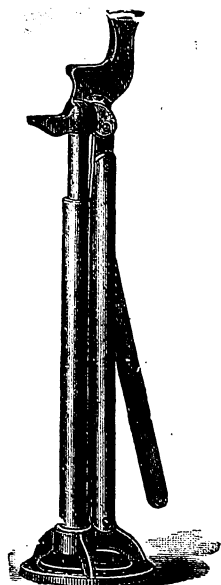


is a fine quality of Axle
Grease put up in square
tin boxes containing
one pound; beautifully
decorated in assorted
colors; designed espe-
cially for the Hardware
Trade. Showy and at-
tractive shelf goods.

Send for sample and
prices.

LOVELL, TRACY & CO., 71 Asylum St.,
Hartford, Conn.

VICTOR.

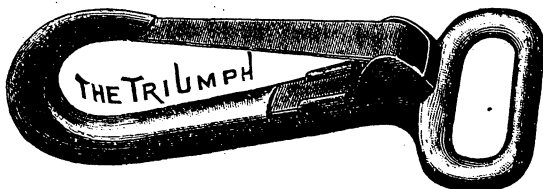


COVERT'S

That Settles It Where to Buy.

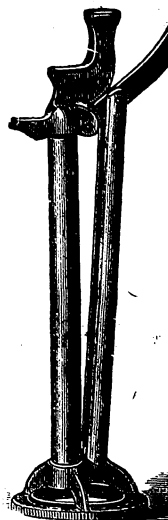
ONLY ONE TRIUMPH SNAP
THAT IS COVERT'S

EVERY
FEATURE
A
TRIUMPH



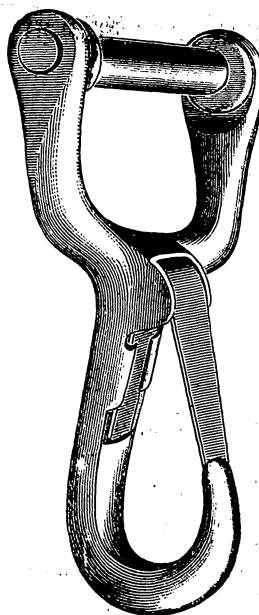
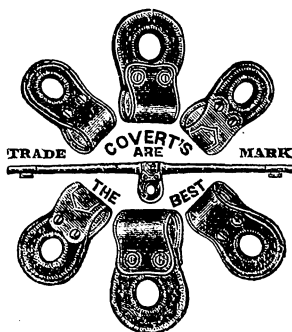
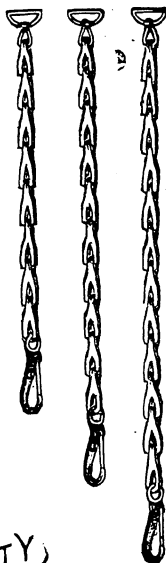
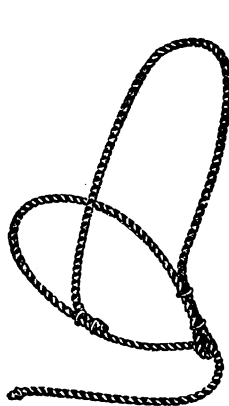
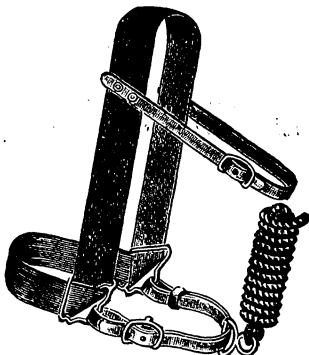
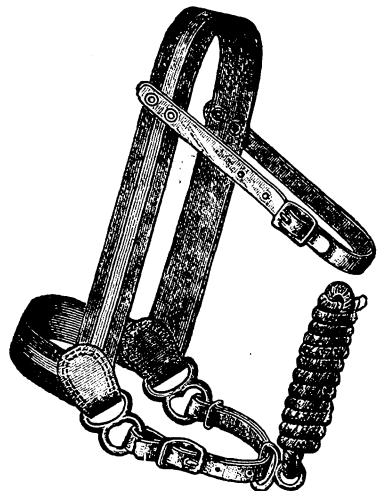
ACCEPT NO OTHER

VICTOR.



Up goes 1,600 lbs. with perfect ease.

Made in all sizes, both loop eye and round eye ; also swivel eye and open eye, and double for bit snap. Roller eye for breast straps and baby sizes for satchels, etc.



Covert's "Success" Rope Clamp.

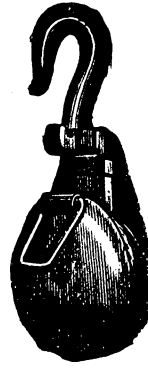
**"Triumph" makes
a Perfect Bit
Snap.**

Roller Eye Breast Strap Snap.

Our Goods are for sale by all the leading Jobbers in the U. S., Canada and Europe at manufacturers' prices. Get our extensive Catalogue in Saddlery, Coach and General Hardware.

COVERT'S SADDLERY WORKS, Farmer, N. Y., U. S. A.

WHY USE WOODEN OR HEAVY STEEL BLOCKS WHEN THE STEEL AND IRON TACKLE BLOCKS



—MADE BY—
The Cleveland Block Co.

CLEVELAND, OHIO, U. S. A.,

ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

General Agents: **Topping Brothers, 92 Chambers Street, New York.**
The H. Channon Co., 22 Market Street, Chicago.
New England Agents, - **Dodge, Haley & Co., 212 High Street, Boston**

NOW IS THE TIME TO PLACE YOUR ORDERS FOR HAY BLOCKS.

Our Self-Oiling Blocks

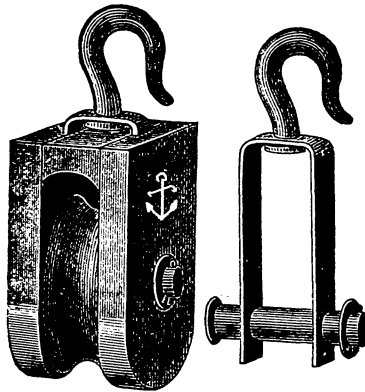
are the best for the least money. They have hard wood shells; wrought iron straps; forged steel hooks and hollow wrought iron axles perforated.

MANUFACTURED BY

Boston & Lockport Block Co.,

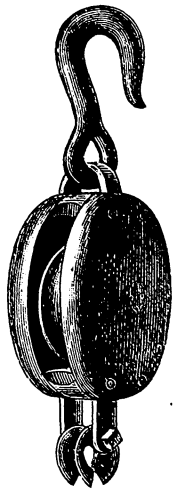
LOCKPORT, N. Y., BOSTON, MASS.

H. B. NEWHALL CO., 105 Chambers St., N. Y. } Agts.
C. H. GURNEY CO., Chicago, Ill.



'S STEEL. WOOD OR IRON

MADE BY
TOLEDO BLOCK WORKS,
511-513-515 Water St., TOLEDO, OHIO,
WILL PROVE SATISFACTORY
TO USER.

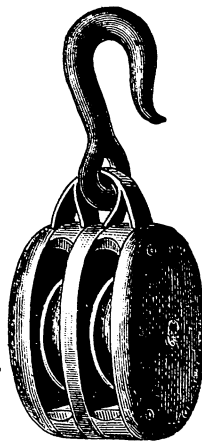


SHUBERT & COTTINGHAM,
MANUFACTURERS OF

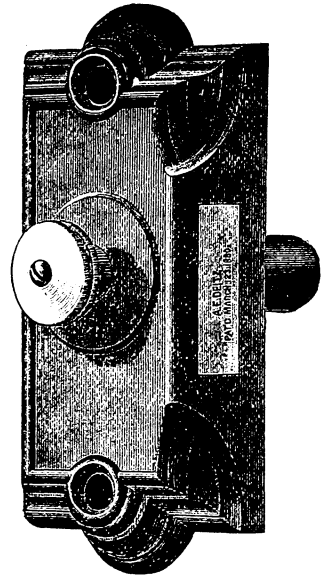


Round Edge Tackle Blocks,
118 North Delaware Avenue,
Factory, Beach and Norris Sts., PHILADELPHIA.

GENERAL AGENTS:
BRITTAN & BOND,
154 Lake St., Chicago, Ill.



A. E. DEITZ.



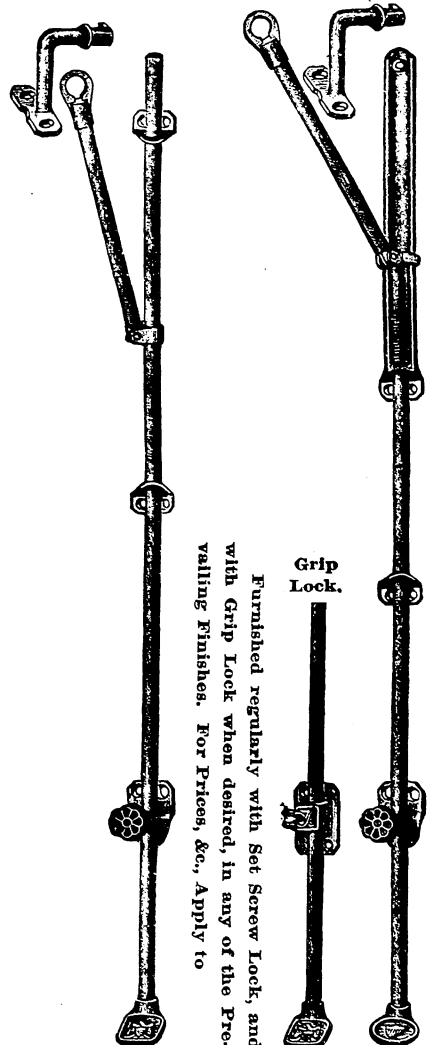
No. 172 Lock.

J. C. McCARTY & CO., Agents, 97 Chambers
and 81 Reade Sts., New York.
Factory, **BROOKLYN, E. D., N. Y.**

TRANSOMLIFTERS

"EAGLE."

"SHIELD."

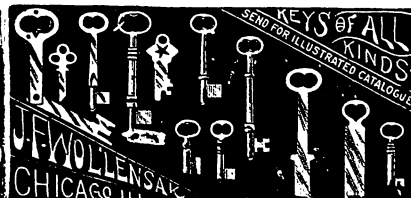


Furnished regularly with Set Screw Lock, and with Grip Lock when desired, in any of the Preferring Finishes. For Prices, &c., Apply to

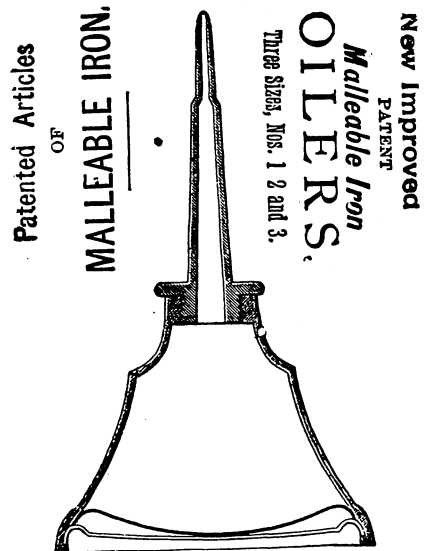
Grip Lock.

J. F. WOLLENSAK, PATENTEE
CHICAGO, ILLINOIS.

The Phonograph and How to Construct It.
With a chapter on sound. By W. GILBERT. Deals with the construction of the phonograph in such a plain manner that the student will clearly understand its construction. A complete set of drawings to scale of the various parts of the phonograph accompany the book. 87 pages, illustrated, 12mo, cloth, \$2.00.
For Sale by **DAVID WIL LIAMS, 96-102 Reade St., N. Y.**



BUFFALO SCALE CO., Buffalo, N. Y. SCALES OF ALL KINDS.



Patented Articles

OF

MALLEABLE IRON.

Three Sizes, Nos. 1, 2 and 3.

Malleable Iron
OILERS.New Improved
PATENT

Hammer's Adjustable Clamps.
Mall. Iron Hand Lamps.
M. I. Hanging Lamps.

New Pattern Heavy Screw Clamps.
Strongest in the market.

For Sale by all the Principal Hardware Dealers.
SEND FOR PRICE LIST.

MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties
in Malleable Iron, made to order.

HAMMER & CO., Branford, Conn.

HOWARD IRON WORKS

BUFFALO, N. Y.,

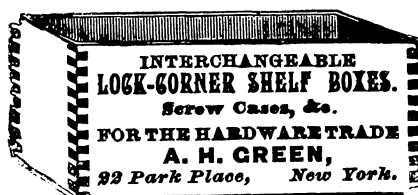
Manufacturers of

BOLT CUTTERS

AND NUT TAPPING MACHINES.

(Schlenker's Patent).

Send for Illustrated Catalogue.



BERGER'S PATENT TRUCKS.
The Handiest, Cheapest and
best in existence.

Highest testimonials from those in
use. Wholesale agents wanted in every
city. Correspondence from Truck Man-
ufacturers solicited. Circulars, price-
lists and full particulars furnished.

BERGER BROS.,

237 Arch St., Philadelphia, Pa.



This Wrench can be furnished with Long
Nut or Sleeve.

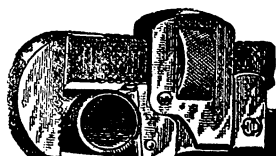
COMBINATION WRENCH.

Case-Hardened Throughout.

Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the
requisite combinations of a regular Nut Wrench, thus making a combination which has no equal.
For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A



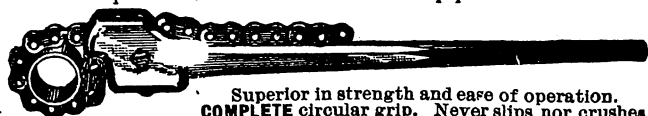
TRIMO PIPE WRENCH,

Forged Steel.

All parts interchangeable.

Grips firmly without loss of motion, Releases readily. Never locks, Causes no
trouble in close quarters. Does not crush the pipe.

**TRIMO
CHAIN
PIPE
WRENCH.**



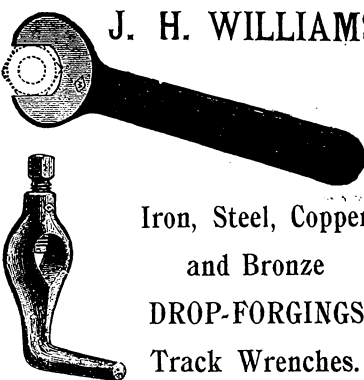
Superior in strength and ease of operation.
COMPLETE circular grip. Never slips nor crushes.

Can be used with one
hand and in closer quarters
than any other Basin
Wrench. Parts interchange-
able.



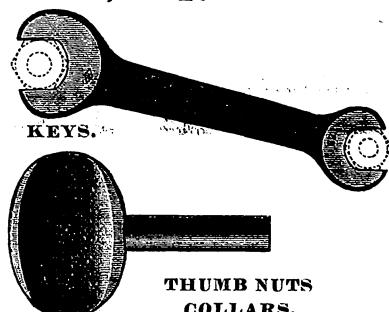
**TRIMO
BASIN WRENCH.**

TRIMONT MFG. CO., ROXBURY,
MASS.



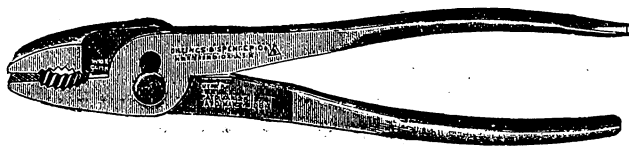
**J. H. WILLIAMS & CO., 9-15 Richards Street,
BROOKLYN, N. Y.**

Iron, Steel, Copper
and Bronze
DROP-FORGINGS.
Track Wrenches.



**THUMB NUTS
COLLARS.**

COMBINATION PLIERS.



Gas Pliers
Wire Cutters
Wrench and
Screw Driver
Combined.

DROP-FORGED FROM BEST TOOL
STEEL AND FINELY FINISHED.

THE BILLINGS & SPENCER CO.

HARTFORD, CONN.

London House: Chas. Churchill & Co., 21 Cross St., Finsbury.

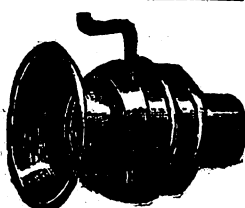
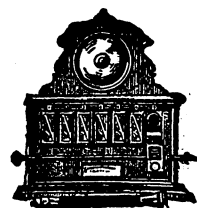
W. R. OSTRANDER & CO.,

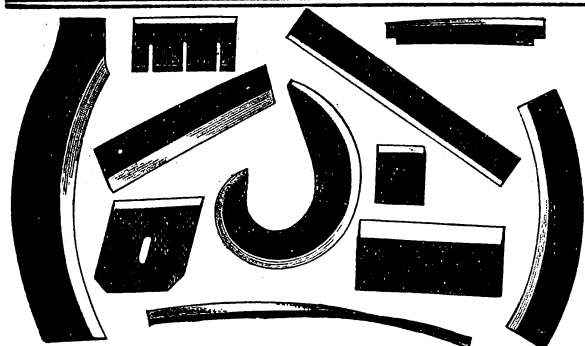
195 & 197 FULTON STREET, NEW YORK.

Manufacturers of

SPEAKING TUBES, WHISTLES, ORAL, ELECTRIC,
MECHANICAL AND PNEUMATIC ANNUNCIATORS
AND BELLS.

Complete outfits of Speaking Tubes, Whistles,
Electric, Mechanical and Pneumatic Bells. A full line
always in stock. Send for new catalogue. Factory,
DeKalb ave., near Knickerbocker, Brooklyn, N. Y.





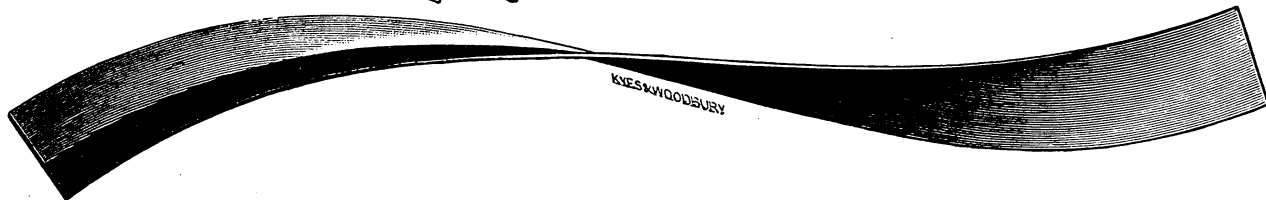
LORING COES & CO.

WORCESTER, MASS.

Manufacturers of **MACHINE KNIVES.**

Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades Etc., showing how the Steel is laid.



THE IMPROVED ACME STEEL WRENCH

PATENTED.

CAPITOL MFG. CO.,

Cable Address: "CAPITOL, CHICAGO."

125 to 137 REES STREET,
CHICAGO, ILL., U. S. A.

Awarded Prize Medal at Paris Exposition and Jamaica Exposition



HERCULES.
Bright Finish.



HERCULES.
Combination Pipe Bolt and
Nut Wrench. Bright Finish

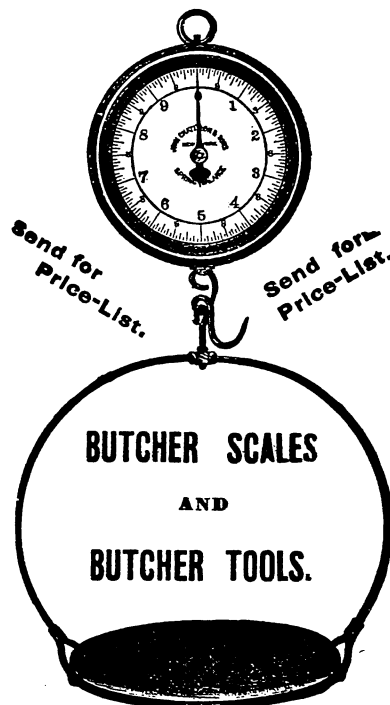


The Hercules Screw Driver and Tack Claw (Patented). This Screw Driver is made from one piece of special cast steel, in all sizes, from 1 1/4 in. to 12 in. The blade is well polished, carefully tempered, and every screw driver is subjected to a severe test and warranted. Handles Japanned with the best quality baking Japan.

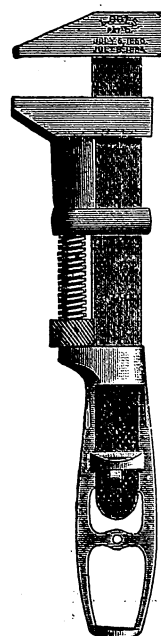
The Strongest and Most Durable Wrench and Screw Driver Made.

Write for Prices and Full Information.

HARMON & DIXON, 118 Chambers St., New York, N. Y., Eastern and Export Agents.



JOHN CHATILLON & SONS,
85, 87 and 89 Cliff St., New York.



L. COES'

Genuine Improved
KNIFE HANDLE
PATENT

Screw Wrenches

MANUFACTURED BY
COES WRENCH CO.,
WORCESTER, MASS.

Established in
1839.

Registered
March 31, 1874.

Patented July
8, 1880.

Patented July
8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

1/2" Straight Bar, Extra Long Nut for Screw in Jaw.

The BEST MADE and STRONGEST WRENCH in the MARKET

J. C. McCARTY & CO.,
JOHN H GRAHAM & CO. } New York Agents.

• **IMPROVED MINE LAMP** •
FOR ANTHRACITE AND
BITUMINOUS
MINING.

6
DIFFERENT
STYLES
OF SPOUTS.

SEAMLESS
BRASS
COLLAR
BRASS HINGE
Lid solid
No SOLDERING

SAMPLE 15¢.

B. E. LEONARD, Scranton, Pa.

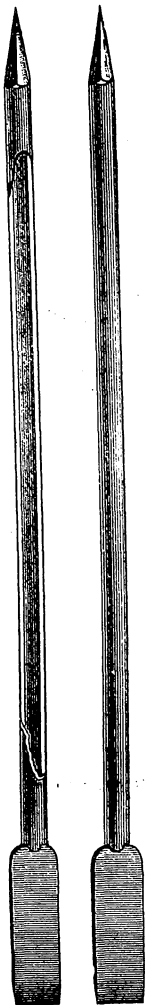
PATENT AIR TUBE MINE LAMP.
FIVE DIFFERENT
SIZED
SPOUTS

SEAMLESS
BRASS
COLLAR
BRASS HINGE
Solid Lid
NO SOLDERING
HINGE
CANNOT
MELT OFF.

SEND 15 CENTS FOR SAMPLE TO SAMPLE

T. F. LEONARD - Scranton, Pa.

Shimer's Patent Hollow Handled Post Hole Digger.

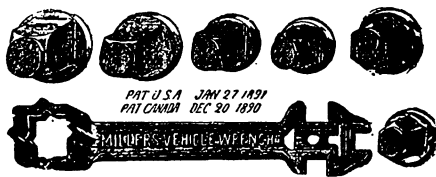


*The lightest, strongest and
easiest handled Digger
in the market.*

Write for Discounts to

L. & R. Wister & Co.,
SOLE AGENTS,
PHILADELPHIA, PA.

MILLER'S PAT. VEHICLE WRENCH

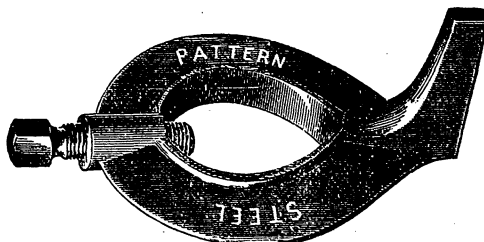


Three sizes (Nos. 1, 2 and 3), each fitting eight different sized nuts—4 square, 2 hexagon, 2 octagon—total capacity of three sizes ranging from 1/2 inch to 2 inches.

Manifest advantages over all other vehicle wrenches — Best air furnace malleable iron, smoothly cast, neatly japanned.
Cheap in price. Sample by mail 25c.

ST. LOUIS WRENCH CO.,
308 Lucas Ave., ST. LOUIS.

LE COUNT'S LIGHT STEEL DOG,



WITH STEEL SCREWS.

U. S. Standard. Points Hardened.

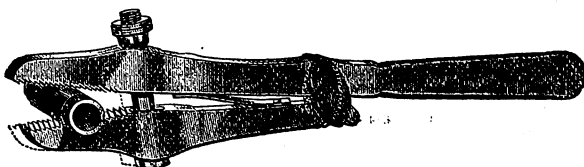
No.	Inch.	Price.	No.	Inch.	Price.
1	3/8	\$0 35	7	1 1/4	\$1 00
2	1/2	55	8	1 1/2	1 10
3	3/4	60	9	2 1/4	1 40
4	1	60	10	3	1 50
5	1 1/4	75	11	3 3/4	1 70
6	1 1/2	85	12	4	1 90

Small set of 8, \$5.50. Full set of 12, \$12.

SEND FOR CATALOGUE OF FULL LINE OF MACHINISTS' TOOLS.

C. W. LE COUNT, MANUFACTURER, SO. NORWALK, CONN., U. S. A.
These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

THE "CURTIS" WRENCH.



Patented April 8, 1890.

The most Effective, Reliable and Perfect Wrench in the market.

—MANUFACTURED ONLY BY—

AMERICAN SAW CO., Trenton, N. J.
SEND FOR CATALOGUE.

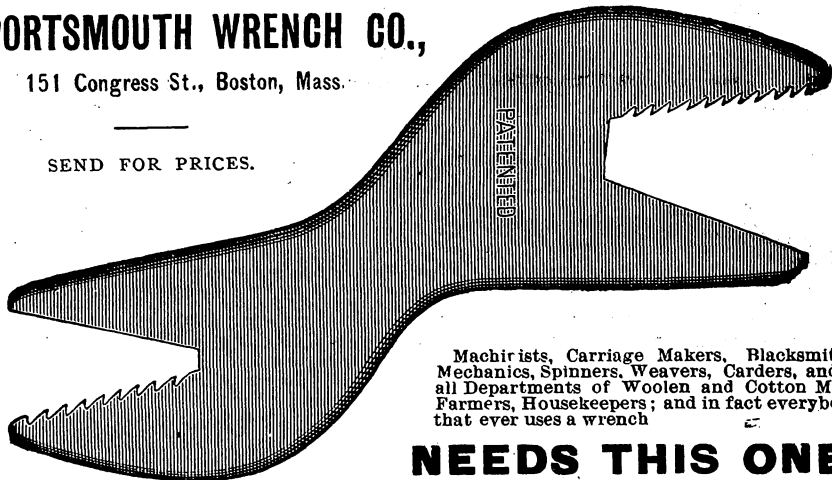
"Always Ready" Wrench.

FORGED STEEL, NICKEL PLATED.

PORTSMOUTH WRENCH CO.,

151 Congress St., Boston, Mass.

SEND FOR PRICES.



Machinists, Carriage Makers, Blacksmiths, Mechanics, Spinners, Weavers, Carders, and in all Departments of Woolen and Cotton Mills, Farmers, Housekeepers; and in fact everybody that ever uses a wrench

NEEDS THIS ONE.

SICKELS, SWEET & LYON,

Wholesale Hardware.

Office, 35 Barclay St. Warehouse, 40 Park Place, New York.

SELLING AGENTS FOR

"Perfection" and "New Easy" Lawn Mowers,
Cortland Door and Window Screens,
"Eagle" Files,
Union Steel Screws.
Full line Steel and Wood Farming Tools. Shipments from Factories or Store.
Spring Catalogue No. 5 Issued in February.

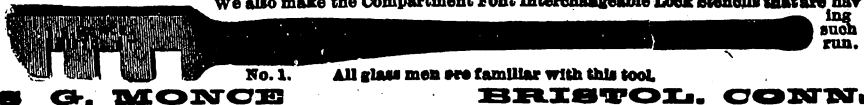
SICKELS, PRESTON & NUTTING CO.,

Wholesale Hardware and Tinnery's Stock.

N. Y. Office as above.

DAVENPORT, IOWA.

MONCE'S Novelty Glass Cutters are the standard. No. 17 just out. Send for Illustrations and Price. We also make the Compartment Font Interchangeable Lock Stencils that are having such run.



No. 1.

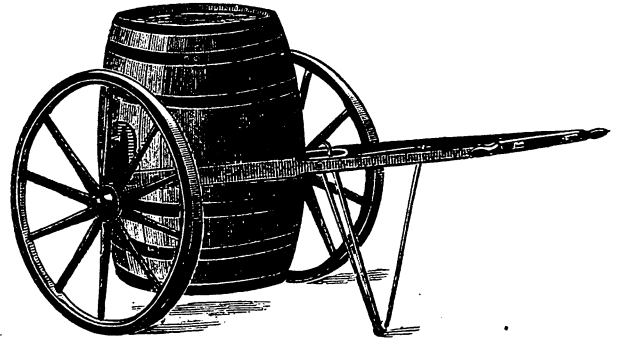
All glass men are familiar with this tool.

G. MONCE

BRISTOL, CONN.

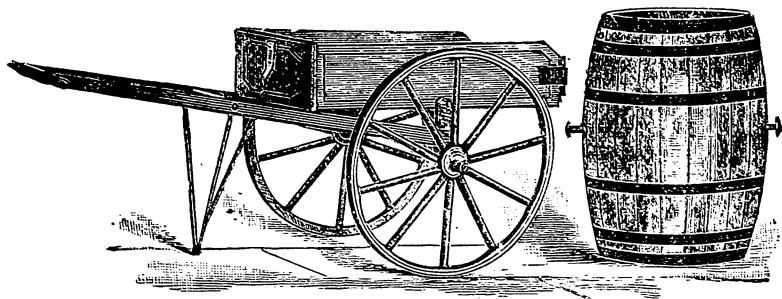
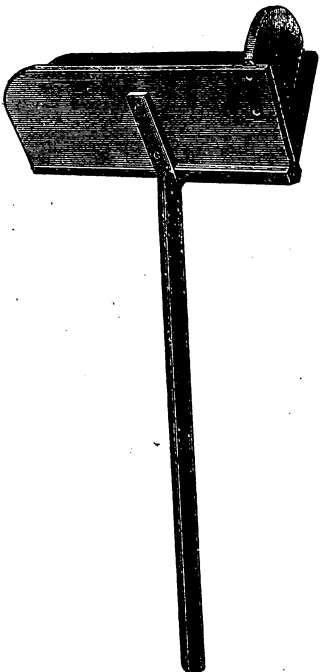
Barrel Carts AND Hods.

WATER OR BARREL CART.



Any number of barrels can be used with the cart, as it is not permanently attached to either box or barrel. Used with any ordinary oil barrel. The barrel is raised from the ground, carried to the place desired, and *instantly detached*, all *without handling*. The weight being balanced over the axle, no lifting or down pressure is needed in transportation. Other barrels for various purposes can be used as needed, extra trunnions being furnished, if desired, which can be readily attached to any oil or spirit barrel, thus increasing indefinitely the value of the truck.

A good box furnished, when desired, which can be easily attached.



WATER OR BARREL CART

WITH BOX.

The above cut shows the Water or Barrel Cart with Box, also the way trunnions are fastened to barrel

We carry in stock both Philadelphia and Western Pattern, and make any shape to order.

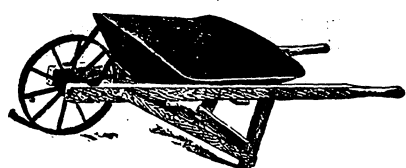
When in need of Barrows, write for prices to

LANSING WHEELBARROW CO.,
LANSING, MICH.

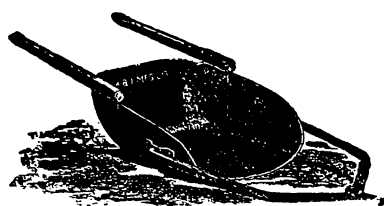
When

You want a stock of good Barrows or Scrapers, don't seek the cheapest in price.

There's no profit in it, because you have to sell them cheap, and—besides stand the abuse of the buyer on account of their flimsy construction.



This is not saying "ours are dear," but simply what has been the experience of hundreds of dealers.

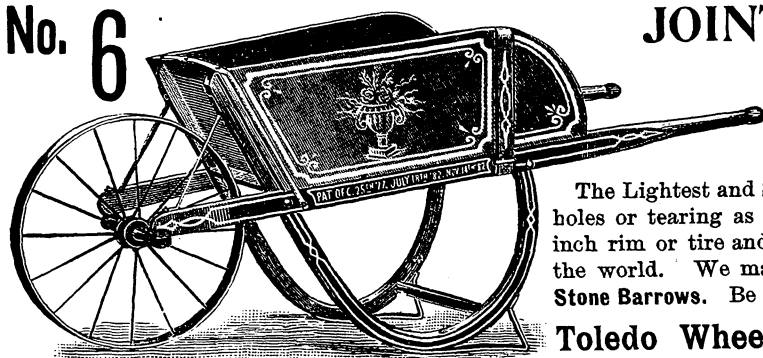


Our productions are made as good as it is possible to make them, and at as low cost as the largest manufacturing capacity in this line in the world will admit of.

The Kilbourne & Jacobs Mfg. Co., Columbus, O., U. S. A.

No. 6

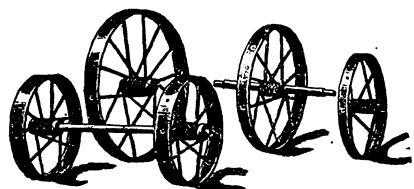
JOINTLESS BENT LEG GARDEN BARROW.



The Lightest and Strongest. Legs will not mar the Lawn by punching holes or tearing as do the ordinary barrow. With its 20-inch wheel, 1½ inch rim or tire and chilled cap boxes, it is the easiest running barrow in the world. We make Railroad, Dump, Mortar, Sand, Coal, Wood, Tile and Stone Barrows. Be sure to write for catalogue "A."

Toledo Wheel Barrow Works, - Toledo, Ohio.

WHEELS. WHEELS. WHEELS.



The best there is made for Wheelbarrows and Trucks. Send for Circular and Prices.

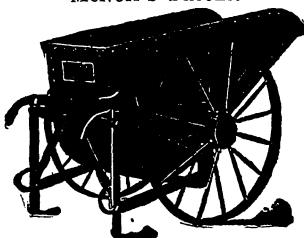
Address

THE Arnold Metal Wheel Co.

Mention *The Iron Age*. New London, Ohio

THE AKRON TOOL CO., Akron, O. Balanced Charging Barrows,

McNeil's Patent.



AUTOMATIC DUMP. IT HAS NO EQUAL.

ALSO

AKRON TUBULAR STEEL WHEEL-BARROWS

ONE MAN CAN HAUL A TON. RE-ENFORCED TRAY. CORNERS DOUBLE THICKNESS.

ALL STEEL WHEELBARROWS & SCRAPERS

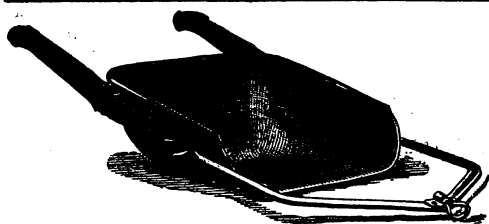
MANUFACTURED BY

AMERICAN STEEL SCRAPER CO.,

1104 Court St., SIDNEY, O.

Write
for
Catalogue



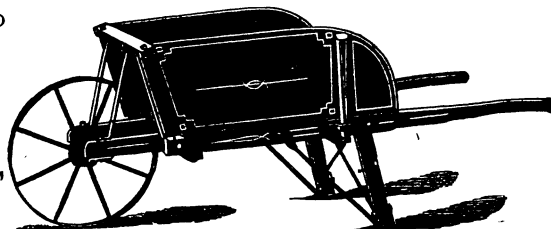


A Garden Barrow

Should at once be light and strong and so proportioned as to make the load carried as nearly self balancing as possible. Do those you sell do this?

Ours embrace these and many other valuable points. Suppose you write for catalogue.

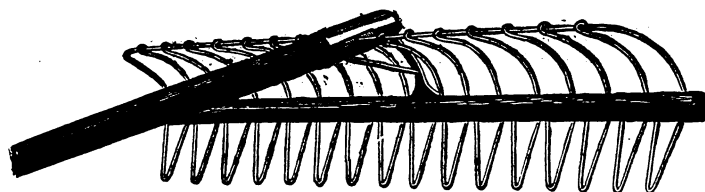
Sidney Steel Scraper Co., 924 Poplar Street, SIDNEY, O.



LAWN RUBBISH, ETC.,

Should be removed now. Dealers recommend the "GEM" or "DAVIS" Steel Wire Rakes, because they don't injure the young and tender blades that are cropping out, and always insure a more satisfactory lawn surface than the use of any other will. Write for prices.

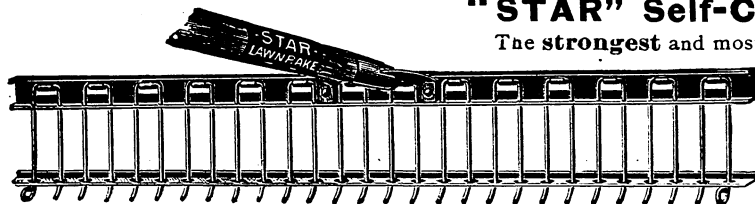
SCHAEFFER & CO., Dayton, O.



"STAR" Self-Cleaning Lawn Rakes. All Steel.

The strongest and most practical rakes in the market. The cleaning bar keeps the teeth free from leaves and grass and the eyes on the end teeth prevent the other teeth from digging in the ground. We also make "STAR" Lawn Rakes as above without the self-cleaning bars and turned up end teeth.

SYRACUSE SPECIALTY MFG. CO., Syracuse, N. Y., U. S. A.
SURPLESS, DUNN & ALDER, 97 Chambers St., New York,
DIRECT REPRESENTATIVES.



"STAR" Self-Cleaning Lawn Rake.
Pat. Feb. 21, 1893.

HENLEY'S LAWN MOWERS

First-class high grade machines, made of the best materials. Neat, symmetrical, strong, durable and unexcelled in construction and ease of operation. Does perfect work. For prices address

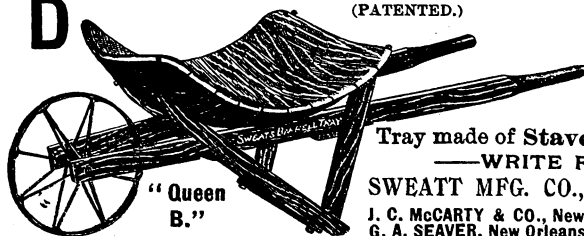


M. C. HENLEY, Sole Mfr., Richmond, Ind., U. S. A.

GARPENTER & BAYLES, Eastern Agents, 91 Chambers St. & 73 Reade St., New York City.

"BARREL TRAY" WHEELBARROWS.

(PATENTED.)



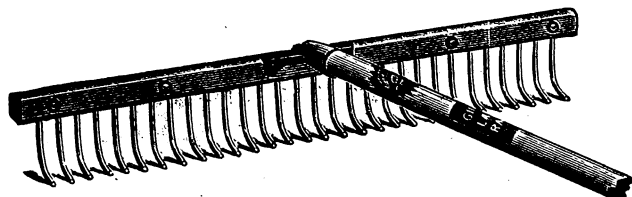
"Queen B."

BEST TRAY FRAME WHEEL.

Tray made of Staves strung on Iron Rods.
— WRITE FOR PRICES. —

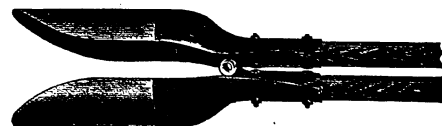
SWEATT MFG. CO., Minneapolis, Minn.
J. C. McCARTY & CO., New York, Direct Representatives.
G. A. SEAVER, New Orleans, Special Agent.

The most popular and cheapest Lawn Rake on the market is the "Can'on."



Send for Prices and New Catalogue.

NATIONAL POST HOLE DIGGER.



When in the market for **LAWN RAKES and POST HOLE DIGGERS**

Remember our line is the largest, best and most complete made.

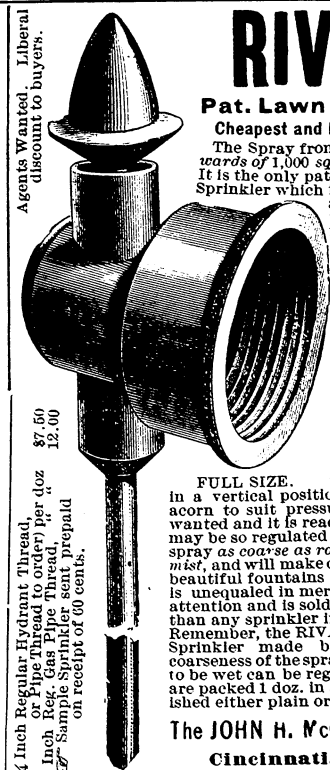
GIBBS MANUFACTURING CO., Canton, Ohio, or Jno. H. Graham & Co., 113 Chambers St., New York.

RIVAL

Pat. Lawn Sprinkler
Cheapest and Best in Use.

The Spray from it covers upwards of 1,000 sq. feet of lawn. It is the only patent adjustable Sprinkler which is adaptable to any water pressure. Being made of brass, and having no revolving parts to wear out, or small openings to clog up, it can be operated with sandy or muddy water as well as clear, and will last for years. To operate, screw Sprinkler on end of hose, stick the rod in to the ground in a vertical position, adjust the acorn to suit pressure and spray wanted and it is ready for use. It may be so regulated as to throw a spray as coarse as rain or as fine as mist, and will make one of the most beautiful fountains imaginable. It is unequalled in merit, requires no attention and is sold at a price less than any sprinkler in the market. Remember, the RIVAL is the only Sprinkler made by which the coarseness of the spray and the area to be wet can be regulated. They are packed 1 doz. in a box, and finished either plain or nickel plated.

THE JOHN H. MCGOWAN CO.
Cincinnati, Ohio.



Agents Wanted - Liberal discount to buyers.
¾ Inch Regular Hydrant Thread, \$7.50
1 Inch Regular Hydrant Thread, 12.00
1 Inch Reg. Gas Pipe Thread, 12.00
2" Sample Sprinkler sent prepaid on receipt of 60 cents.

Chadborn & Coldwell Manufacturing Co.,

NEWBURGH, N. Y.

Chicago, Ill., 55-57 N. Clinton St.

London, Eng., 223 Upper Thames St.

Manufacturers of
"The NEW MODEL,"

"NEW MODEL" HIGH WHEEL,

The "O. K.,"

The "RIVAL,"

"EXCELSIOR"

ROLLER

and "EXCELSIOR"

HORSE

Lawn
Mowers.

NEW
"EXCELSIOR"
HORSE

LAWN

MOWER.

The Most Extensive Manufacturers of LAWN MOWERS
in America.

Every Lawn Mower we manufacture is FULLY WARRANTED.

It will pay you to send to us for
descriptive catalogue and trade dis-
counts before placing your orders
for Lawn Mowers for the coming
season.

GENUINE PHILADELPHIA LAWN MOWERS. 350,000 IN THE FIELD.

Hand Sizes 10 to 20 inch.

Pony and Horse 30 and 36 inch.

**Lawn Sweepers and
Collectors.**

Send for Price-List and Discounts.

GRAHAM, PASSMORE & CO.,

No. 631 Market St, Philadelphia Pa.

THE CHIEF

Lawn Mower With Horse
Attachment.

TEN INCH TRACTION WHEEL. EXCELS FOR FINE QUALITY OF MATERIAL AND
FINISH. SIMPLE ADJUSTMENTS. SMOOTH CUTTING.

THE ONLY FIRST-CLASS COMBINATION MOWER ON THE MARKET. PRICES LOW.
TERMS REASONABLE.

MANUFACTURED BY

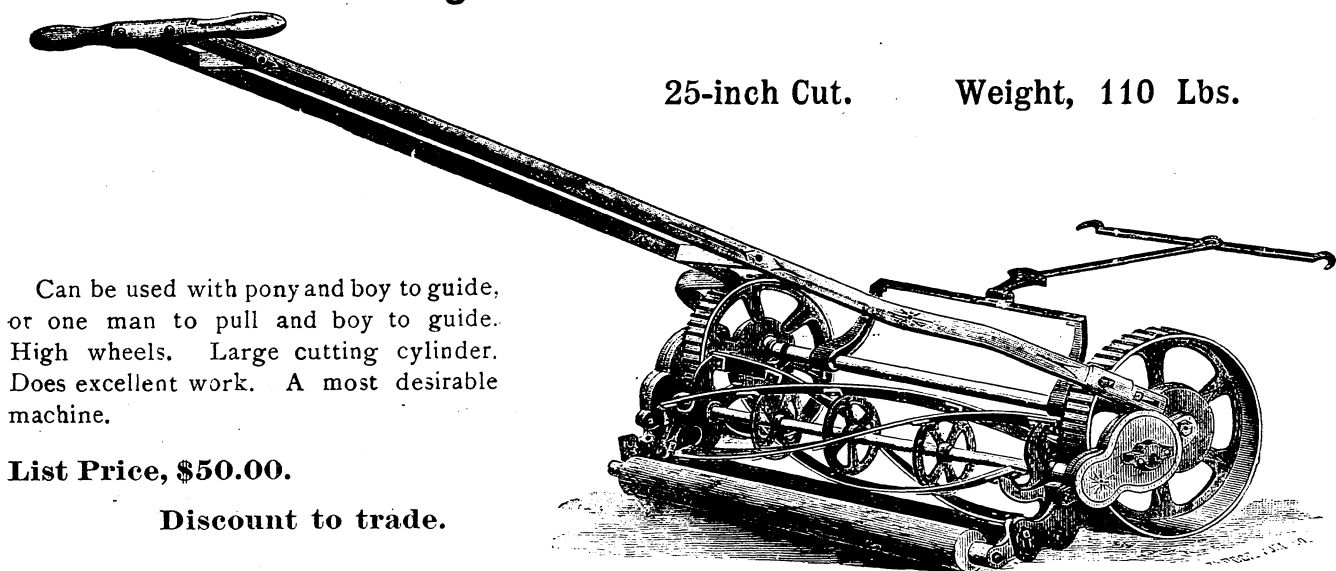
CHAMPION MFG. CO.,

LAWN MOWERS, RAKES, Etc.,

257 Ft. Wayne Ave., Richmond, Ind.

NEW PONY MOWER.

HAS NO EQUAL IN THE MARKET



25-inch Cut.

Weight, 110 Lbs.

Can be used with pony and boy to guide, or one man to pull and boy to guide. High wheels. Large cutting cylinder. Does excellent work. A most desirable machine.

List Price, \$50.00.

Discount to trade.

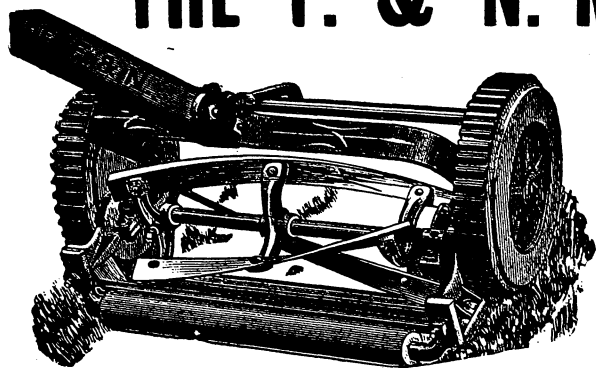
Also Manufacturers of PENNSYLVANIA, CONTINENTAL, GREAT AMERICAN, RAPID TRANSIT, NEW QUAKER CITY, NEW DEPARTURE LAWN MOWERS, HORSE AND PONY MOWERS AND GRASS CATCHERS.

There is no question for doubt that the manufacturers of these Mowers manufacture double the quantity of Lawn Mowers of any other manufacturer in the known world, and have not made their reputation from price alone, but from the quality of Mowers turned out.

SUPPLEE HARDWARE CO., PHILADELPHIA.

BLAIR MANUFACTURING CO. SPRINGFIELD, MASS.
 MANUFACTURERS OF
LAWN SPRINKLERS, TURF EDGERS, & C.
 Write for Circulars and Prices. **LAWN MOWERS** OF HIGHEST GRADE
 FOR HAND AND HORSE-POWER.

THE F. & N. MFG. CO.,



Manufacturers of
Lawn Mowers, Lawn Sweepers and Grass Catchers,
 RICHMOND, IND., U.S.A.

The F. & N. High Grade Lawn Mower. Fully Guaranteed.

AGENTS:
 Woodrough & Hanchett Co., Chicago, Ill.
 C. F. Guyon Co., Ltd., New York.
 Woodrough, Mansfield & Co. Boston Mass.

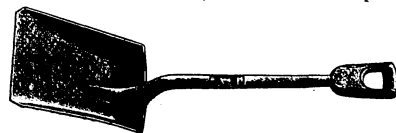
A. M. ROSS & CO.,

ILION, N. Y.



(Successors to
 REMINGTON
 AG'L CO.)

Manufacturers of the best Wood and Iron Beam Steel, or Carbon, Right or Left Hand Plows in market. Also Standard Solid Steel Shovels, Coal Shovels, Coal and Grain Scoops and Spades and the new Patent Steel Snow Shovels. Furnace, Coal and Ash Scoops, Ice Choppers and Lawn Trimmers, Lawn Weeder, Garden Trowels, &c., &c. Send for prices.



The Cockburn Barrow and Machine Co.

OFFICE AND WORKS:

234 to 240 Eleventh St., JERSEY CITY, N. J.

NEW CONCRETE MIXING MACHINES.

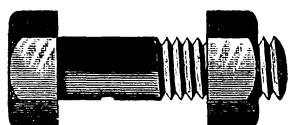
Coal and Ash Buckets, Coaling Tubs, Coal and Coke Cars, Patent Tubular Frame Wheelbarrows, Furnace Charging Barrows and Cars, Sheet Iron Work of every description, Patent Power Punching Machines, Every Description of General Forgings, Dimpfel Blowers, Machine Work.

Manufacture To Order
 SPECIALTIES & NOVELTIES, PATENTED ARTICLES,
 HARDWARE GOODS ETC., SMALL OR FINE MACHINERY.
 SEND FOR CATALOGUE - CORRESPONDENCE SOLICITED
OTTO KONIGSLOW CLEVELAND, O.

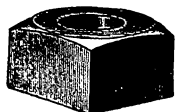


WROUGHT WASHERS

Every Washer.
FLAT
With hole in
TRUE CENTER.



MACHINE BOLTS.



HOT PRESSED NUTS.

Highest
Standard of
EXCELLENCE.

Packed in kegs for general trade, or in 1 and 5 lb. boxes for hardware trade.

It will pay you to correspond with us.

MILTON MANUFACTURING CO., - - MILTON, PA.

E. B. LANMAN, COLD PUNCHED NUTS

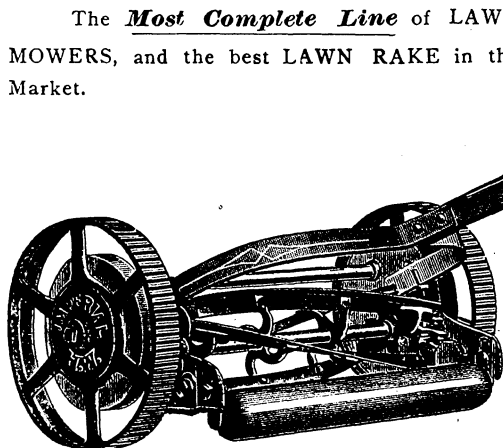
Columbus,
Ohio.

All Standard Sizes, Regular or Odd, to Order.

In Kegs or Packages, convenient for JOBBERS.

COLDWELL LAWN MOWER COMPANY,

The *Most Complete Line* of LAWN
MOWERS, and the best LAWN RAKE in the
Market.

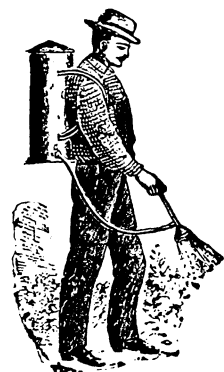


Newburgh, N. Y.

Our IMPROVED HORSE
LAWN MOWER Has no Com-
petitor.

IMPERIAL,
HIGH WHEEL,
STANDARD,
NEW YORK,
MODEL.

Different Styles and Prices,
but *All Good Sellers*. Our paper,
"THE LAWN," mailed free to
any address



Boss Sprinkler.

For Potatoes, Tobacco,
Cotton and all small
Plants and Vines.

Has given satisfaction
to all who have
handled it.

Prices and Circulars sent
on application

OLIVER A. SMITH,
CLARKSTON, MICH.

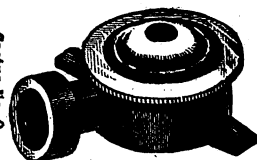


Japanese No. 12, Adjust.

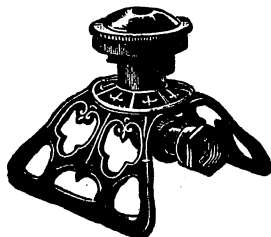
LAWN SPRINKLERS

We manufacture the BEST and
CHEAPEST Lawn Sprinklers in
the World.

Cactus No. 9.



The only Sprinklers which have no revolving parts to leak or wear out.
The only Sprinklers free from small holes, and which cannot become clogged with gritty sub-
stances.
The only Sprinklers which are adjustable and will give a spray as fine as the mist of Niagara, or
as heavy as the area of the supply pipe.
The best Sprinklers for high pressures, and the only sprinklers which will give satisfaction with
low pressures.
We also manufacture the old style revolving sprinklers, but for our own use would not have them
as a gift.



Cactus No. 6.

ETTE & HENGER MFG. CO.

ST. LOUIS MO.

SEND FOR DESCRIPTIVE CIRCULARS.



National No. 8.

The "Reliable" WEED KILLER.

Strong, Simple, Sure. A Seller.

Able agents who are money makers wanted
Write

SHAW & CLANCY,
RACINE, WIS.

THE REX Lawn Mower.

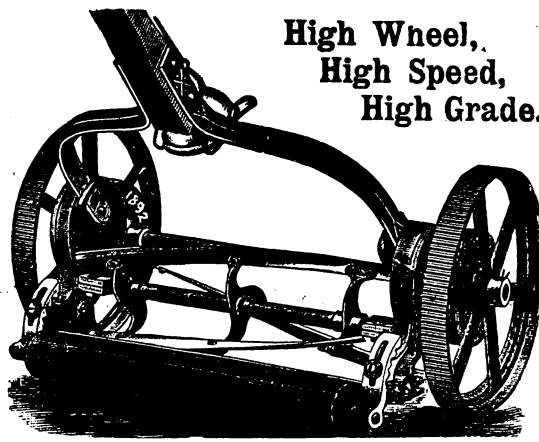
Fully Guaranteed.

The Best Possible Lawn
Mower for the Least
Possible Money.

MANUFACTURED BY

W. E. LAPE,
Syracuse, N. Y.

C. E. WOODRUFF,
235 Lake Street, Chicago,
Western Sales Agent.



High Wheel,
High Speed,
High Grade.

THE W. BINGHAM CO.,

146, 148 and 150 Water St., and 97 and 99 Superior St.,
CLEVELAND, O.

LAWN MOWERS FOR 1893.

THE BINGHAM.

THE RED CLOUD,

THE  HIGH WHEEL.

THE DIAMOND HIGH GRASS.
THE PHILADELPHIA.

WRITE FOR PRICES.

THE LAWN MOWER'S PARTNER.

It is adjustable to all sizes and makes of Mowers.

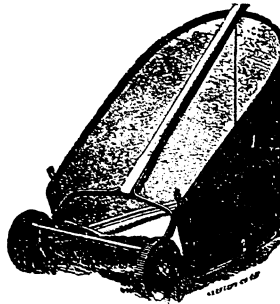
We will guarantee satisfaction.

Also that it will outwear and carry more grass at
one time than all the other so-called carriers combined,
or those cheap canvas bags they call Grass Carriers,
which are useless and dear at any price.

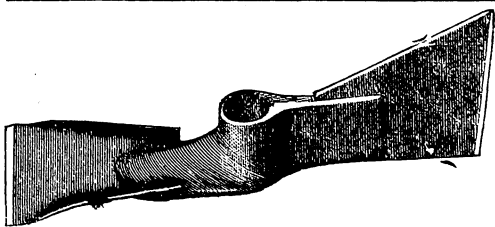
See our exhibit at World's Fair Horticultural Hall.
Send for explanatory circulars and new price-list.

GLENNON & KRAUSE,

Manufacturers, 76th & Wallace Sts., Chicago, Ill.



PATENTED MARCH 17, '91.



"THE EUREKA LAWN MATTOCK"

Is designed as a tool for many purposes, such
as trimming paths, drives, cutting brush,
weeds, thistles or ice, loosening up hard earth
in gardens or flower-beds, etc., etc. It has
steel blades cast in the head and is one of the
most convenient tools for general use ever
made, its price bringing it within the reach of
all. Address

THE RAILWAY SPEED RECORDER CO.,
KENT, O.

HAY KNIVES

SEASON OF 1892-93.

"LIGHTNING"

(Reg. Trade-Mark No. 9583.)

"BLIZZARD"

Reg. Trade-Mark No. 19,390.

It pays to han-
dle **FIRST
CLASS
goods.**



Write us early-
for prices and
terms.

Sole Manufacturers,

The HIRAM HOLT COMPANY,
EAST WILTON, MAINE.

CYCLONE CORN SHELLER.

Will Shell a Bushel
of Corn

Sample Sheller

in 4 Minutes.

\$3.00.

**AGENTS
WANTED.**

**BEST
SHELLER**
in the world.



Ask your
Merchant
for it
Send for
circular.

All Machines
Warranted.

GARRY IRON ROOFING CO., Sole Manufacturers
and Owners, Cleveland O., U.S.A. Mention Iron Age

CALF WEANER. "Shaw's Pat.,"

MADE BY

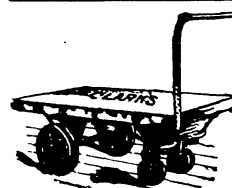
Carroll Muzzle Co.,
CARROLL, IA.

No wounds. No fretting.

Put Weaners on Calves and turn them
out with the cows.
"It is the only machine I ever had that worked per-
fectly in every way."
A. R. ANDERSON, County Supervisor.



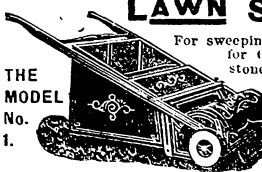
TRUCKS of all
kinds. Mounted
on rubber or
iron wheels. Trucks
made to order.
Write for prices.
Catalogues free.



G. P. CLARK, Box 0,
Windsor, Locks, Conn.

LAWN SWEEPERS.

For sweeping Lawns after mowing,
for gathering leaves, sticks,
stones and litter. Used in
Parks, Cemeteries,
Tennis Courts and all
public and private
grounds. Two sizes.
LAWN ROLLERS.
For keeping lawns and
terraces smooth and
compact. Used when frost is leaving ground and after rain
for re-sodding and laying out yards and flower gardens. Write
for full description and prices. THOMPSON MFG CO.
D. N. WEAVER, Sec'y. ELKHART, INDIANA.

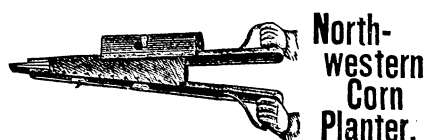


THE WINNER MANUFACTURING CO.
HAMILTON, OHIO, U.S.A.
PATENTED SPECIALTIES.

YANKEE WRENCH.
AJE-BOS CRY SAW HANDLE.
ADJUSTABLE STOVE TRUCK.
COMMON SENSE CASTERS.
HERCULES TRUCK.
HERCULES CASTER.

CATALOGUE FREE

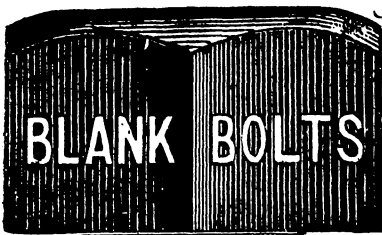
EBHARTWELL
MFR. OF
AXEADZE
PICK.
SLEDGE
HATCHET.
HAMMER.
FOR EXPOS.
AND HOME
15 YEARS
USE. EXPERIENCE.
SEND
FOR
PRICES.
OHIO
STO
GALVINO



Manufactured by **IRVING D. KING,**
Send for circulars. **ORLEANS, N. Y.**

Explosives and Their Powers. By M. BERTHE
LOF. Translated and condensed from the French
by C. NAFFER HAKE, Fellow of the Institute of
Chemistry, Inspector of Explosives to the Govern-
ment of Victoria, and WILLIAM MACNAE, F.I.C.E.
With preface by Lieut.-Colonel J. P. CUNDILL, R. A.
H. M. Inspector of Explosives. With illustrations.
8vo, cloth.....\$9.60
For sale by David Williams, 96-102 Reade St., N. Y.

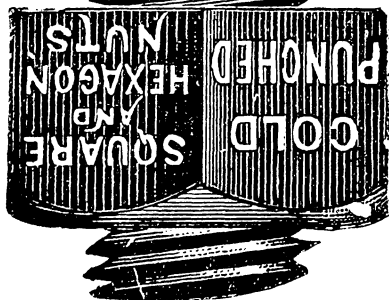
LAG SCREWS



COTTON AND WOOLEN MILLS AND MACHINERY MANUFACTURERS.

AMERICAN-BOLT-CO.
MANUFACTURERS
LOWELL MASS

BOLTS OF ALL KINDS FOR RAILROADS, BRIDGE BUILDERS.



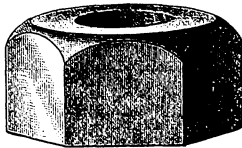
WASHERS OF ALL KINDS.

Port Chester Bolt & Nut Co.,

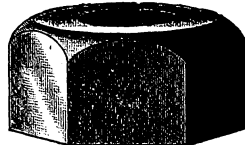
PORT CHESTER, N. Y.

MANUFACTURERS OF

Cold Punched, Chamfered and Trimmed, Case-Hardened
and Semi-Finished



NUTS.



NUTS FOR RAILROADS, CAR BUILDERS', LOCOMOTIVE BUILDERS' AND MACHINISTS'
USE A SPECIALTY.

CORRESPONDENCE SOLICITED.

ESTABLISHED 1865.

J. H. Sternbergh & Son,

READING PA.

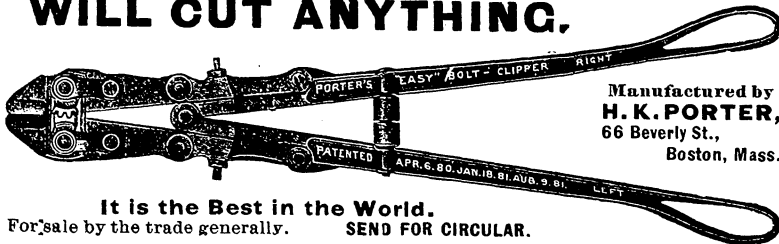
MANUFACTURERS OF

BOLTS, NUTS, WASHERS, RIVETS,

Including Machine Bolts, Carriage Bolts, Bridge Bolts and Car Bolts,
THE HARVEY PATENT GRIP-THREAD TRACK BOLT, Soft Steel Bolts with Cold Rolled
Thread, Bolt Ends, Turnbuckles, Sleeve Nuts, Lag Screws, Set Screws and Tap Bolts and every variety of
screwed work.

BOILER, BRIDGE AND SHIP RIVETS, Square and Hexagon Nuts of all kinds and sizes, Plate
Washers, Belt Lacing Machines, Rods and Irons for Bridges and Buildings, Merchant-Bar Iron, etc., etc.
Branch Establishment, **THE KANSAS CITY BOLT & NUT CO.**, Kansas City, Mo.

THE "EASY" BOLT CLIPPER. WILL CUT ANYTHING.



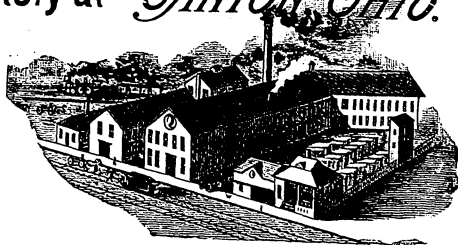
Manufactured by
H. K. PORTER,
66 Beverly St.,
Boston, Mass.

It is the Best in the World.
For sale by the trade generally. SEND FOR CIRCULAR.

23,000 Sold.

The Post Hole Digger Factory at CANTON, OHIO.

LITTLE GIANT,
HERCULES,
INVINCIBLE,
SCHEIDLER,
NEW CHAMPION.



This cut illustrates the
SCHEIDLER

POST HOLE DIGGER,

Strong and Durable. Easily Operated.

Works in all kinds of Soil, Clay, Sand, Gravel, Shale, Etc.
It is a powerful Digger particularly adapted to sandy soil.

Write for illustrated Catalogue of Diggers, Saw Sets, Spring
Steel Curry Combs, Etc.

F. E. KOHLER & CO.,

MANUFACTURERS OF


HARDWARE SPECIALTIES,
CANTON, OHIO.

J. C. McCARTY & CO., 97 Chambers St., New York.

WM. H. HASKELL, PRESIDENT.

E. S. MASON, TREASURER.

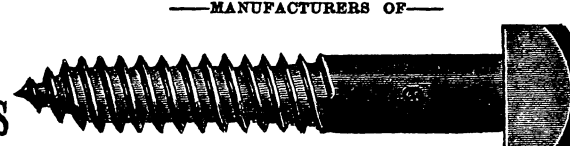
D. A. HUNT, AGENT.




WM. H. HASKELL CO.,

— MANUFACTURERS OF —

**GIMLET POINT
COACH SCREWS**



**Bolts, Cold-Punched
Nuts and Washers,
SUITABLE FOR MACHINERY
OF ALL KINDS.**

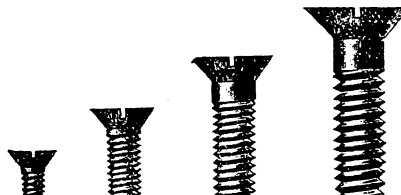


Office and Works: 451 Main St., PAWTUCKET, R. I., U. S. A.

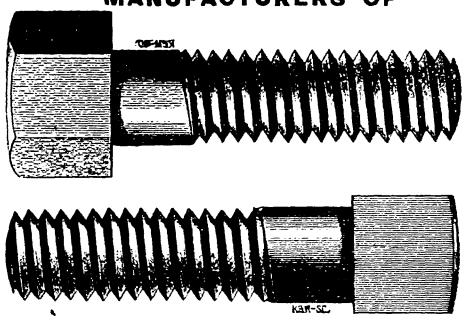
HENRY B. NEWHALL CO., Agents,
105 CHAMBERS STREET, NEW YORK. - 47 PEARL STREET, BOSTON.

WORCESTER MACHINE SCREW CO., Worcester, Mass.

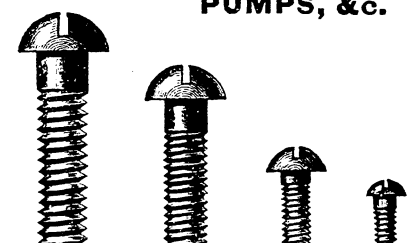
**SET,
CAP AND
MACHINE
SCREWS.**



MANUFACTURERS OF



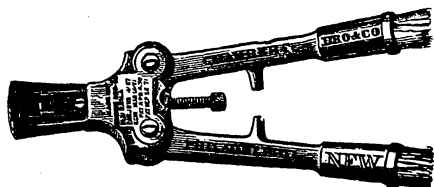
**STUDS FOR
STEAM ENGINES.
PUMPS, &c.**



EXPANSION BOLTS.



For Fastening all kinds of Structure to Brick and Stone Work.
Patentee and M'r, **ISAAC CHURCH,**
Send for Catalogue. Toledo, O.

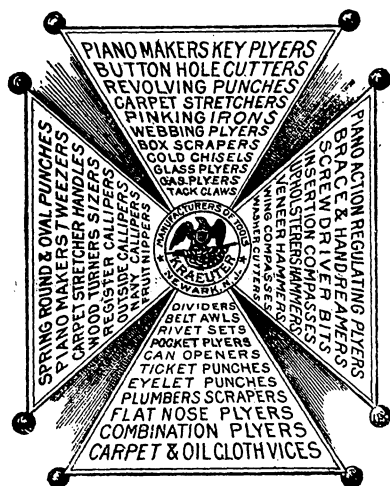


BOLT & RIVET CLIPPERS.

For cutting off the ends of Bolts and Rivets.
Liberal discounts to the trade.

CHAMBERS BROTHERS COMPANY,

52d St., BELOW LANCASTER, AVE.,
PHILADELPHIA, PA.





RIVETS

OF EVERY
DESCRIPTION, FIRST QUALITY.

W.P. TOWNSEND & CO.

NEW BRIGHTON, PA.

5lb. 6lb. 7lb. 8lb. 10lb. 12lb.

Cold Punched Nuts and



J. FRED WILSON, Worcester, Mass.

Metal Punching and Die Work.

Send for prices on Specialties in line of Press Work.

Washers for all purposes.

CLASSIFIED LIST OF ADVERTISERS.

Air Chambers, Copper.
Emory, P. F. Mfg. Co., Springfield, Mass.
Springfield Brass Co., Springfield, Mass.

Air compressors.
Norwalk Iron Works, S. Norwalk, Conn.
Rand Drill Co., 23 Park Place, N. Y.

Air Moving Machinery.
Howard & Morse, 45 Fulton, N. Y.

Aluminum, Brass and Bronze.
Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.
Gaylord, F. L. Co., Ansonia, Conn.
Haight & Clark, Albany, N. Y.
Pittsburgh Reduction Co., Pittsburgh, Pa.
St. Louis Bronze & Aluminum Works, St. Louis, Mo.

Aluminum.
Scovill Mfg. Co., Waterbury, Conn.
Waldo & Stout, Bridgeport, Conn.
Illinois Pure Aluminum Co., Lemont, Ill.

Analysical Chemists.
Britton, J. Blodgett Philadelphia, Pa.
Hunt, Robt. W. & Co., Chicago, Ill.
Moore, Dr. Gideon E., 221 Pearl St., N. Y.

Anti-Friction Metals.—See Babbitt Metal

Anti-Window Rattlers.
Henry, J. T. Mfg. Co., Hamden, Conn.
Anvil and Vise (Combination).

Fulton Iron & Engine Works, Detroit, Mich.

Arms and Ammunition.
Forehand Arms Co., Worcester, Mass.
Harrington & Richardson Arms Co., Worcester, Mass.

Hartley & Graham, 313 & 315 Broadway, New York.

Stevens, J., Arms and Tool Co., Chicopee Falls, Mass.

Union Metallic Cartridge Co., 313 & 315 Broadway, N. Y.

Auctioneers.
Haddock & Blaisell, N. Y.

Augers and Bits.
Snell Mfg. Co., 72 Reade St., N. Y.
Syracuse Twist Drill Co., Syracuse, N. Y.

Axes.
Amer. Axe & Tool Co., 280 B'way, N. Y.
Peck, A. G. & Co., Cohoes, N. Y.
Standard Axe & Tool Co., Ridgway, Pa.

Axle Grease.
Lovell, Tracy & Co., Hartford, Conn.

Axles, Springs, &c. Manufacturers of.
Bettendorf Hollowsteel Axle Works, Davenport, Ia.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.

Winters, F. W., Brooklyn, N. Y.

Babbitt Metal.
Crown Smelting Co., Chester, Pa.
Day Metal Co., St. Louis, Mo.
Pastwood Wire Mfg. Co., Bellville, N. J.
Hertz, T. & Son, St. Louis, Mo.
Keys, W. W. & R. M. Co., Bridgeport, Conn.

Reeves, Paul S., Philadelphia, Pa.

Shaw, Luther & Son, Worcester, Mass.

Bakers and Roasters.
Bronson Supply Co., Cleveland, Ohio.

Bale Ties.
Kilmer Mfg. Co., Newburg, N. Y.

Band Saw Machines.
Cross & Spurr Machine Co., Waterbury, Conn.

Band Saws.
Atkins, E. C. & Co., Indianapolis, Ind.

Barb Wire and Fence.
Consolidated Steel & Wire Co., St. Louis, Mo.

Gautier Steel Dept. of Cambria Iron Co., Johnstown, Pa.

Indiana Wire Fence Co., Crawfordsville, Ind.

Kilmer Mfg. Co., Newburg, N. Y.

Ludlow-Saylor Wire Co., St. Louis, Mo.

Washburn & Moen Mfg. Co., Worcester, Mass.

Bar Iron, Manufacturers of.
Etna Iron & Steel Co., Bridgeport, O.
Allentown Rolling Mill, Philadelphia.

Burden Iron Co., Troy, N. Y.

Montour Iron & Steel Co., Danville, Pa.

Mahoning Valley Iron Co., Youngstown, Ohio.

Starbuck, J. B. & Son, Reading, Pa.

Leavitt Machine Co., Orange, Mass.

Bellows, Manufacturers of.
Bullock Bellows Co., Cleveland, O.
Scott, Geo. M., Chicago, Ill.

Bells.
Bevin Bros. Mfg. Co., East Hampton.

Belt Drives.
Jos. Dixon Crucible Co., Jersey City, N. J.

Belt Fasteners.
Bristol's Mfg. Co., Waterbury, Conn.
Claffen Mfg. Co., Cleveland, Ohio.
Talcott, W. O., Providence, R. I.

Belting, Makers of.
Alexander Bros., 413 N. 3d., Phila.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Phila., Pa.
Main Belting Co., Philadelphia, Pa.
N. Y. Belting & Packing Co., Ltd., N. Y.
Roberts Mfg. Co., Pittsburgh, Pa.
Shultz Belting Co., St. Louis, Mo.

Bicycles.
Bikwell, Geo. R. Cycle Co., 310 W. 59th Street, N. Y.

Bingham, W. Co., Cleveland, Ohio.

Common Sense Bicycle Mfg. Co., Phila.

Coventry Machine Co., Ltd., Boston, Mass.

Hulbert Bros. & Co., 24 W. 23d St. N. Y.

Indiana Bicycle Co., Indianapolis, Ind.

Lovell, J. P. & Co., Boston, Mass.

Marble Cycle Mfg. Co., Plymouth, Ind.

Monarch Cycle Co., Chicago, Ill.

Pope Mfg. Co., Boston, Mass.

Read, Wm. & Sons, Boston, Mass.

Rouse-Durva Cycle Co., Peoria, Ill.

Western Wheel Works, Chicago, Ill.

Winton Bicycle Co., Cleveland, Ohio.

Bird Cages.
Pierce, Geo. N. & Co., Buffalo, N. Y.

Bits and Braces.
Am. Bit Brace & Tool Co., Buffalo, N. Y.
Bridgeport Gun Implement Co., 313-315 Broadway, N. Y.
Fray, Jno. S. & Co., Bridgeport, Conn.
Jennings, J. E. & Co., W. Cantoners, N. Y.

Blocks, Tackle, Makers of.
Boston & Lockport Block Co., Boston, Mass.
Mass. and Lockport, N. Y.
Cleveland Block Co., Cleveland, O.
Fulton Iron & Engine Works, Detroit, Mich.

Shubert & Cottingham, Philadelphia, Pa.

Toledo Block Works, Toledo, O.

Blowers.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.

Huyett & Smith Mfg. Co., Detroit, Mich.

Sturtevant, E. F. & Co., Boston, Mass.

Boiler Makers' Rolls.
New Doty Mfg. Co., Janesville, Wis.

Boiler Plates.
Carbon Steel Co., Pittsburgh, Pa.
Mollish, Wm. & Sons, Reading, Pa.

Lynch Iron & Steel Co., Coatesville, O.

Pottstown Iron Co., Pottstown, Pa.

Boilers, Copper.
Randolph & Clowes, Waterbury, Conn.

Boilers, Steam.
Babcock & Wilcox Co., 30 Cortlandt.
Edge Moor Iron Co., Wilmington.

Harrison Safety Boiler Wks., Phila., Pa.

Kendall, Edw. & Son, Cambridgeport, Mass.

Boiler Iron Works Co., Meadville, Pa.
Pollock, W. B. & Co., Youngstown, O.

Southwark Fdy. & Mch. Co., Phila., Pa.

Wetherill, Robt. & Co., Chester, Pa.

Boiler Cutters.
Chambers Bros. Co., Philadelphia.

Howard Iron Works, Buffalo, N. Y.

Parter, H. K., Boston, Mass.

Wells Bros. Co., Greenfield, Mass.

Wiley & Russell Mfg. Co., Greenfield, Mass.

Books.
Lamberson, B., Portland, Ore.
Marine Review, Cleveland, Ohio.

Williams, David, 94-102 Reade, N. Y.

Boring Machines.
Buckeye Mfg. Co., Union City, Ind.

Box Bender.
Goodell & Harding, Burlington, Vt.

Boxes, Hdw. Shell, &c.
Estes, E. B. & Sons, 254 Pearl St., N. Y.

Green, A. H., 22 Park Place, N. Y.

Jones, Jesse & Co., Philadelphia, Pa.

Box Straps and Corners.
Buffalo specialty Mfg. Co., Buffalo, N. Y.

Cary Mfg. Co., 7-9 Elm St., N. Y.

Brake Shoes.
Sargant Co., Chicago, Ill.

Brass, Manufacturers of.
Ansonia Brass & Copper Co., N. Y.

Davol, John & Sons, 100 John, N. Y.

Holmes, Booth & Haydens, N. Y.

Plume & Atwood Mfg. Co., N. Y.

Randolph & Clowes, Waterbury, Conn.

Rome Brass and Copper Wks., Rome, N. Y.

Scovill Mfg. Co., Waterbury, Conn.

Waterbury Brass Co., 296 B'way, N. Y.

Brass Butt Hinges.
Tiebout, W. & J., 16 & 18 Chambers.

Brass Founders.
Cramp, Wm. & Sons, S. & E. B. Co., Philadelphia, Pa.

Emory, P. F. Mfg. Co., Springfield, Mass.

Haight & Clark, Albany, N. Y.

Keys, W. W. & R. M. Co., Bridgeport, Conn.

North Bros. Mfg. Co., Phila., Pa.

Reeves, Paul S., Philadelphia, Pa.

Shaw, Luther & Son, Worcester, Mass.

Brass Goods.
Brass Goods Mfg. Co., 88 Chambers.

Bread Knives.
Christy Knife Co., Fremont, O.

Bridge Builders.
Berlin Iron Bridge Co., East Berlin, Ct.

Boston Bridge Works, Boston, Mass.

Wrought Iron Bridge Co., Canton, O.

Brackets (Robin).
Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.

Brooms and Brushes.
Cincinnati Mfg. Co., Cincinnati, Ohio.

Lay, Jos. & Co., Ridgewood, Ind.

Builders' Hardware.
Brittan, Graham & Mathes, Pittsburgh, Pa.

Deltz, A. E., 97 Chambers St., N. Y.

Reading Hdw. Co., Reading, Pa.

Yate & Towne Mfg. Co., Stamford, Ct.

Butcher and Shoe Knives, Manufacturers of.
Goodell Co., Antrim, N. H.

Wilson, John, Sheffield, England.

Butts and Hinges.
Brittan, Graham & Mathes, Pittsburgh, Pa.

McKinney Mfg. Co., Allegheny, Pa.

Sabin Machine Co., Montpelier, Vt.

Stanley Works, New Britain, Conn.

Tiebout, W. & J., 19 Chambers, N. Y.

Cabinet Makers' Hardware.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

Calipers and Dividers.
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.

Starrett, L. S., Athol, Mass.

Carroll Muzzle Co., Carroll, Ia.

Can Makers' Tools and Machines.
Niagara Stamping and Tool Co., Buffalo, N. Y.

Car Axles.
Roberts, A. P. & Co., Phila.

Carbide Lamps.
Hillebrand & Wolf, Philadelphia, Pa.

Car Wheels.
Whitney, A. & Sons, Phila.

Carriage Hardware, Makers of.
Cover's Saddlery Works, Farmer, N. Y.

Ecobles, Richard, Auburn, N. Y.

Seaton Forging Co., Seaton, Pa.

Smith, H. D. & Co., Plantersville, Conn.

Wilcox & Howe Co., Birmingham, Conn.

Cartridge Reloading Tools.
Ideal Mfg. Co., New Haven, Conn.

Casters, Wheel, &c.
Clark, G. P., Windsor Locks, Conn.

Gwiner Mfg. Co., Hamilton, O.

Tucker & Dorsey Mfg. Co., Indianapolis, Ind.

Casting, Iron and Steel.
Ames Sword Co., Chicopee, Mass.

Arcade Malleable Iron Co., Worcester, Mass.

Aschman Steel Casting Co., Thurlow, Pa.

Booth, The Lloyd Co., Youngstown, O.
Rural, Wiley, Buffalo, N. Y.

The Burr & Houson Co., Brooklyn, N. Y.
Cambria Steel—Cambria Iron Co., Johnstown, Pa.

Cheney, S. & Son, Manlius, N. Y.

Chester Steel Casting Co., Phila.

Chrome Steel Works, Brooklyn, N. Y.

Cite & Hanger Mfg. Co., St. Louis, Mo.

Eureka Cast Steel Co., Chester, Pa.

Flagg, Stanley G. & Co., Phila.

Haight & Clark, Albany, N. Y.

Hammer & Co., Branford, Conn.

Herriock, J. A., 284 Pearl St., N. Y.

Johnson Foundry Co., Johnstown, Pa.

Johnson, I. G. & Co., Spuyten Duyvil, N. Y.

Mahoning Fdy. & Mch. Co., Danville, Pa.

New Castle Steel Casting Co., New Castle, Pa.

Northwest Malleable Iron Co., Milwaukee, Wis.

Palmer & De Mooy, Cleveland, O.

Passaic Art Casting Co., Passaic, N. J.

Patterson Foundry & Mfg. Co., Birdsboro, Pa.

Pratt & Letchworth, Buffalo, N. Y.

Sargent Co., Chicago, Ill.

Seaton Foundry Co., Bristol, Conn.

Shepard Hdw. Co., Buffalo, N. Y.

Shickler, Harrison & Howard Iron Co., St. Louis, Mo.

Shilling Mfg. Co., Columbus, O.

Spencer's, I. S., Sons, Guilford, Conn.

Standard Fdy. & Mfg. Co., Cleveland, O.

Standard Steel Casting Co., Thurlow, Pa.

Syracuse Steel Foundry, Syracuse, N. Y.

Taylor & Boggs Fdy. Co., Cleveland, O.

Taylor Iron & Steel Co., High Bridge, N. J.

Totten & Hogg Iron & Steel Fdy. Co., Pittsburgh, Pa.

Trenton Mal. Iron Co., Trenton, N. J.

Union Mfg. Co., 103 Chambers St., N. Y.

Wetherill, Robt. & Co., Chester, Pa.

Chains.
Bradlee & Co., Philadelphia.

Bridgeport Chain Co., Bridgeport, Conn.

Link-Belt Engineering Co., Phila., Pa.

McKay, Jas. & Co., Pittsburgh, Pa.

Cherry Stoners.
Goodell Co., Antrim, N. H.

Chimneys.
Phila. Engineering Works, Phila., Pa.

Chisels, Manufacturers of.
Buck Bros., Millbury, Mass.

White, L. & I. J. Co., Buffalo, N. Y.

Chucks.
Cushman Chuck Co., Hartford, Conn.

Graham Mill Drill & Chuck Co., Detroit, Mich.

Hoggan & Pettis Mfg. Co., New Haven, Conn.

Horton, E. & Sons Co., Windsor Locks, Conn.

Smith & Egge Mfg. Co., Bridgeport, Conn.

Skinner Chuck Co., New Britain, Conn.

Union Mfg. Co., 103 Chambers, N. Y.

Whitton, D. E. Mach. Co., New London, Conn.

Churns.
Buckeye Churn Co., Sidney, O.

Clamps.
Hammer & Co., Branford, Conn.

Le Count, C. W., So. Norwalk, Conn.

Clippers.
Lee, Jesse & Sons, Philadelphia, Pa.

Clipping Machines.
Hutchins, E. S., Bridgeport, Conn.

McKay, Jos. F. & Co., 28 Warren St.

Clock Springs, Manufacturers of.
Haley Mfg. Co., Concord, N. H.

Coal.
Barns, C. K. & Co., Philadelphia, Pa.

Wister, Francis, Philadelphia, Pa.

Coffee and Spice Mills.
Sun Mfg. Co., Greenfield, O.

Cooking.
Barns, C. K. & Co., Philadelphia, Pa.

Houston, C. B. & Co., Philadelphia, Pa.

Rainey, W. J., Cleveland, O.

Sibell, Geo. H. & Co., Chicago, Ill.

Wister, Francis, Philadelphia, Pa.

Collections.
Board of Trade (Limited) 4 and 6 Warren, N. Y.

Condensers.
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.

- Grant Corundum Wheel Mfg. Co.**, Chester, Mass.
Hamden Corundum Wheel Co., Springfield, Mass.
Hampden Emery and Corundum Co., Chester, Mass.
Michigan Emery Wheel Co., Detroit, Mich.
N. Y. Belting & Packing Co. Ltd., N. Y.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Springfield Emery Wheel Mfg. Co., Bridgeport, Conn.
Waltham Emery Wheel Co., Waltham, Mass.
- Enamels.**
Nubian Iron Enamel Co., Cragin, Ill.
- Engineers and Contractors.**
Alken Henry, Pittsburgh, Pa.
Artificial Gas Engineering Co., Pittsburgh, Pa.
Brady Mfg. Co., Brooklyn, N. Y.
Carten, Henry J., Pittsburgh, Pa.
Christie, W. Wallace, Paterson, N. J.
Curtis, Gram, Pittsburgh, Pa.
Herrick, J. A., 234 Pearl St., N. Y.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
Lean, D. R. Co., Pittsburgh, Pa.
McClure, Amster & Co., Pittsburgh, Pa.
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.
Roberts, Frank C., Philadelphia, Pa.
Smythe, S. R. Co., Incorporated Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
Wilkie, Botwell & Co., Ltd., Pittsburgh, Pa.
- Engines, Gas.** Works, Phila., Pa.
Ohio Gas Engine Co., Cincinnati, O.
Waukegan Engine Co., Waukegan, Ill.
Buckeye Engine Co., Salem, O.
Cleveland & Harwick, Erie, Pa.
Lane & Bodley Co., Cincinnati, O.
Leffel, W. C. Co., Springfield, O.
Norwalk Iron Works Co., So. Norwalk, Conn.
Shipman Engine Co., Boston, Mass.
Southward Foundry and Machine Co., Phila., Pa.
Tod, William & Co., Youngstown, O.
Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**
Sweester, W. B., Brooklyn, Mass.
- Expansive Bolts.**
Boone, W. C. & Son, Brooklyn, N. Y.
Church, Isaac, Toledo, O.
- Faucets, Self-Measuring.**
Lane Bros., Poughkeepsie, N. Y.
- Faucets, Wooden.** **Makers of.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**
Berryman, Jas., Philadelphia, Pa.
Davis, I. B. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
National Bending Co., New Haven, Conn.
Webster, Warren & Co., Phila., Pa.
Whitlock Coil Pipe Co., Elmwood, Conn.
- Fencing, Iron and Wire.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Clinton Wire Cloth Co., Clinton, Mass.
DeKalb Fence Co., DeKalb, Ill.
Gilbert & Bennett Mfg. Co., 42 Cliff St., Hartman Mfg. Co., Beaver Falls, Pa.
Kilmer Mfg. Co., Newburgh, N. Y.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
Reliance Wire Works Co., Milwaukee, Wis.
- Fiber Ware.**
Standard Fiber Ware Co., Mankato, Minn.
- Files, Importers of.**
Moss, F. W., 80 John, N. Y.
- Files and Raps, Manufacturers of.**
Banker & White, Troy, N. Y.
Barnett, G. & H., 41 & 43 Richmond, Phila.
Butcher, W. & S., 135 Duane St., N. Y.
McCaffrey File Co., Philadelphia.
Nicholson File Co., Providence, R. I.
- Fire Brick, Makers of.**
Borger, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B. & Sons, foot E. Houston, St. Maurer, E. Co., 430 E. 23d, N. Y.
Renovo Fire Brick and Clay Co., Phila.
Ostrander Fire Brick Co., Troy, N. Y.
Presbury Stone Lining Co., Taunton, Mass.
Valentine, M. L. & Bro., Woodbridge.
- Fire Nets.**
Troy Nickel Works, Troy, N. Y.
- Fishing Tackle.**
Dame, Stoddard & Kendall, Boston, Mass.
- Enterprise Mfg. Co.**, Akron, O.
- Flint and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Fly Fans.**
Mathall, Ingram & Co., Baltimore, Md.
Flour Sifters.
Meyers, F. J. Mfg. Co., Covington, Ky.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Forges, Portable, &c.**
Bradley & Co., Syracuse, N. Y.
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Scranton Forging Co., Scranton, Pa.
- Foundry Facings.**
Chicago Fdy. Supply Co., Chicago, Ill.
MacKellar Foundry Facing & Supply Co., Quincy, Ill.
Paxson, J. W. & Co., Phila.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.
Whitehead Bros. Co., 517 W. 15th St., N. Y.
- Foundry Riddles.**
Estey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**
Chicago Fdy. Supply Co., Chicago, Ill.
Collins, Victor, Detroit, Mich.
MacKellar Fdy. Facing & Supply Co., Quincy, Ill.
S. Obermayer Co., Cincinnati, O.
Paxson, J. W. & Co., Philadelphia.
Smith, J. D. Fdy. Supply Co., Cinn., O.
Whitehead Bros. Co., 517 W. 15th St., N. Y.
- Friction Clutches.**
Moore & White Co., Philadelphia, Pa.
- Fruit Presses.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Fuel Burners.**
Collins, W. S., 45 Drexel Bldg., N. Y.
- Furnaces, Gasoline.**
Burgess Soldering Furnace Co., Columbus, Ohio.
- Garden Tools.**
Dunlap, C. W., Box 2703, New York.
Noyes, B. B. & Co., Greenfield, Mass.
- Gas Generators.**
Gregory, Geo. B., Boston, Mass.
- Gas Producers.**
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Pancoast & Maule, Phila., Pa.
- Gear Cutters.**
T. E. Whiton Mach. Co., New London, Conn.
- Gears.**
Boston Gear Works, Boston, Mass.
Gleason Tool Co., Rochester, N. Y.
New Process Raw Hide Co., Syracuse, N. Y.
Peole, Robt. & Son Co., Baltimore, Md.
Union Fdy. & Mch. Co., Pittsburgh, Pa.
- Glass Tubes.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
- Glass Cutters.**
Monroe, S. G., Bristol, Conn.
- Gluers.**
Baeder, Adamson & Co., Phila., Pa.
Improved Process Glue Co., Gloucester, Mass.
Leggett & Bros., 301 Pearl St., N. Y.
Massa Cement Co., Gloucester, Mass.
- Grass Catchers.**
Glennon & Krause, Chicago, Ill.
Thompson Mfg. Co., Elkhart, Ind.
- Grinding and Polishing Machines.**
Diamond Mch. Co., Providence, R. I.
Herrick & Cowell, New Haven, Conn.
Norton Emery Wheel Co., Worcester, Mass.
Washburn Shops, Worcester, Mass.
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
Huron Grindstone Co., Port Austin, Mich.
- Gun Implements.**
Union Hdq. Co., Torrington, Conn.
- Gunpowder, Makers of.**
Lafin & Rand Powder Co., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Hand Screws.**
Grand Rapids Hand Screw Co., Grand Rapids, Mich.
- Handies.**
Estes, E. B. & Sons, 254 Pearl St., N. Y.
Hartwell, E. B., Galipolis, Ohio.
New Process Raw Hide Co., Syracuse, N. Y.
New York Mallet and Handle Wks., 456 E. Houston St., N. Y.
- Hangers, Door.**
Cronek Hanger Co., Elmira, N. Y.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Hardware, General Merchants.**
Doscher, Martin, 88 Chambers, N. Y.
Graham, John H. & Co., 111 Chambers St., New York.
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Dunlap, C. W., Box 2703, New York.
Hotchkiss, E. S., Bridgeport, Conn.
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 108 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**
Bingham, W. Co., Cleveland, O.
Graham, John H. & Co., 113 Chambers, Hussey E. J. & Co., 30 John St., N. Y.
McCoy, Jos. F. Co., 48 Warren St., N. Y.
Sticks, Sweet & Lywell, 35 Barclay, N. Y.
Surplus, Dunn & Alder, 97 Chambers St., New York.
Underhill, Clinch & Co., 94 Chambers St., N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Belden Machine Co., New Haven, Conn.
Clark Mfg. Co., Buffalo, N. Y.
Cleveland Fdy. Co., Cleveland, O.
Ellis, Geo. D. & Sons Co., Philadelphia, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Gwinner Mfg. Co., Hamilton, O.
Hart, H. C. Mfg. Co., Detroit, Mich.
Henn, A. S. & Co., New Haven, Conn.
Home Novelty Mfg. Co., St. Louis.
North Bros. Mfg. Co., Philadelphia, Pa.
Shepard, Sidney & Co., Buffalo, N. Y.
Welland, Chas., 145 Chambers St., N. Y.
Wilson, J. Fred, Worcester, Mass.
Wire Goods Co., Worcester, Mass.
Underhill, Clinch & Co., 94 Chambers Street, N. Y.
- Hardware, Yacht and Ship.**
Ferdinand, L. W. & Co., Boston, Mass.
- Harness Snaps.**
Covett Mfg. Co., West Troy, N. Y.
Covett's Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Hay Knives.**
Holt, Hiram, Co., E. Wilton, Me.
- Hoisting Machines.**
Box, Alfred & Co., 514 Green, Phila.
Jrow, Hoisting & Conveying Mch. Co., Cleveland, Ohio.
Copeland & Bacon, 35 Liberty St., N. Y.
Fulton Iron & Engine Wks., Detroit, Mich.
Harrington, E. & Son, Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 98 Liberty, N. Y.
Marls & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
- Hollow-Ware.**
Bronson Supply Co., Cleveland, Ohio.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Speidel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
Cleveland Stamping & Tool Co., Cleveland, O.
Stuart & Peterson Co., Phila., Pa.
- Hollowware, Aluminum.**
Illinois Pure Aluminum Co., Lemont, Ill.
Horse and Barbers' Clippers.
Hotchkiss, E. S., Bridgeport, Conn.
- Horse Nails, Makers of.**
National Horse Nail Co., Vergennes, Vt.
Horse Shoes, Makers of.
Bryden Horse Shoe Co., Catsaqua, Pa.
Bullen Iron Co., Troy, N. Y.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Standard Horse Shoe Co., Boston, Mass.
The Burden Iron Co., Troy, N. Y.
- Hose.**
N. Y. Belting & Packing Co. Ltd., 15 Park Row, N. Y.
- Hose Menders.**
Hudson, C. E. & Co., Leominster, Mass.
- Hotels.**
The Audubon, Chicago, Ill.
- Hydrants, &c.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Jacks.**
Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.
- Ice-Cream Freezers.**
North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
Shepard Hdw. Co., Buffalo, N. Y.
Shepard, Sidney & Co., Buffalo, N. Y.
White Mountain Freezer Co., Nashua, N. H.
- Ice Shavers.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Injectors.**
Jenkins Bros., New York.
Sherrwood Mfg. Co., Buffalo, N. Y.
- Insurance, Boiler.**
Harford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**
Cornell, Edw. & Co., 29 B'way, N. Y.
Cotton, Bradley & Co., Philadelphia.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Levy, Jerome & Co., Philadelphia.
Les, J. Tattall & Co., Philadelphia.
Mohr, J. J., 430 Walnut, Philadelphia.
Mann, E. & Co., Philadelphia.
Pilling & Crane, Philadelphia, Pa.
Sibell, Geo. H. & Co., Chicago, Ill.
Wilhelm & Co., Harrisburg, Pa.
Wister, L. & R. Co., Phila., Pa.
- Iron Ore.**
Pickards, Brown & Co., Chicago, Ill.
Pulman, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.
- Iron, Merchants.**
Barnes, O. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Bussard, C. W., Philadelphia.
Cornell, Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 446 West St., N. Y.
Naylor & Co., 45 Wall St., N. Y.
Richards, Wm. H. & Co., Albany.
Ogden & Wallace, 85 Elm St., N. Y.
Pickards, Brown & Co., Chicago, Ill.
Pierson & Co., 24-27 West, N. Y.
Richards, Wm. H. & Co., Albany, N. Y.
Washington Streets, N. Y.
Whitney, A. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.
- Iron, Importers.**
Abbott, Jere & Co., N. Y. and Boston.
Lundberg, Gustaf, Boston, Mass.
- Iron, Sheet, Manufacturers of.**
Atma Iron & Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
W. Dewees Wood Co. Lim., McKeesport, Pa.
- Ironwork, Ornamental.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Lane Fence & Wire Co., St. Louis, Mo.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Mast, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Knives, &c.**
Davies, Chas. & Co., Williamsport, Pa.
- Ladles.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamp Stoves.**
Cleveland Foundry Co., Cleveland, O.
- Lathes.**
Bradford Mill Co., Cincinnati, Ohio.
Johnson, Israel H., Jr. & Co., Philadelphia, Pa.
Miller, Pauls Co., 93 Reade, N. Y.
Sebastian Lathe Co., Cincinnati, O.
Sebastian, May & Co., Sidney, O.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**
Clifton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Lawn Mattedocks.**
Railway Speed Recorder Co., Kent, O.
- Lawn Mowers.**
Bingham, W. Co., Cleveland, O.
Blair Mfg. Co., Springfield, Mass.
Chadborn & Coldwell Mfg. Co., Newburg, N. Y.
Champion Mfg. Co., Richmond, Ind.
Coldwell Lawn Mower Co., Newburg, F. & N. Mfg. Co., Richmond, Ind.
Graham, Passmore & Co., Phila., Pa.
Henley, M. C., Richmond, Ind.
Lape, W. E., Syracuse, N. Y.
Mast, Foss & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supple, Hdw. Co., Phila., Pa.
Surplus, Dunn & Alder, 97 Chambers St., N. Y.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, O.
Schaeffer & Co., Dayton, Ohio.
Syracuse Specialty Mfg. Co., Syracuse, N. Y.
- Lawn Sprinklers.**
Blair Mfg. Co., Springfield, Mass.
Ette & Henger Mfg. Co., St. Louis.
McGowan, John H. Co., Cincinnati, O.
- Lawn Sweepers.**
Lape, W. E., Syracuse, N. Y.
- Lawn Swings.**
Davies, Chas. & Co., Williamsport, Pa.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letter Boxes.**
Merriam Mfg. Co., Durham, Conn.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Davis & Cook, Watertown, N. Y.
Richardson, C. F. & Son, Athol, Mass.
- Locks & Knobs, Manufacturers.**
Brittan, Graham & Mathes, Pittsburgh, Pa.
Delta, A. E., 97 Chambers, N. Y.
Reading Hdw. Co., Reading, Pa.
Romer & Co., Newark, N. J.
Sargent & Co., 37 Chambers St., N. Y.
Smith & Egge Mfg. Co., Bridgeport, Yale & Towne Mfg. Co., Stamford.
- Lubricators.**
Lunkenheimer Co., Cincinnati, Ohio.
Wadham's Oil & Grease Co., Milwaukee, Wis.
- Machinery.**
Am. Tool Works, Cleveland, Ohio.
Anthracte Brass Wks., Tamaqua, Pa.
Barnes, W. F. & John, Rochester, Ill.
Becker, J. M. Mfg. Co., Fitchburg, Mass.
Bement, Miles & Co., Philadelphia, Pa.
Bertsch & Co., Cambridge City, Ind.
Bingelow, G. E. & Son, N. Y.
Bliss, E. W. Co., Brooklyn, N. Y.
Bogert, Jas. L., Elushing, N. Y.
Bradford Mill Co., Cincinnati, Ohio.
Briggs, Marvin, 12 Broadway, N. Y.
Brown & Sharpe Mfg. Co., Providence, R. I.
Carlin's Sons, Thos., Allegheny, Pa.
Cinn. Milling Mfg. Co., Cincinnati, Ohio.
Clapp, Geo. M., apt. 74 Cortlandt, N. Y.
Coulter & McKenzie Mch. Co., Bridgeport, Conn.
Cruikshank, D. B., Providence, R. I.
Davis, W. P., Rochester, N. Y.
Detrick & Harvey Mch. Co., Baltimore, Md.
Fitchburg Mch. Works, Fitchburg, Mass.
Garvin Mch. Co., Laight & Canal Sts.
Gould & Eberhardt, Newark, N. J.
Harrington, E. & Son, Co., Phila.
Harvey Machine Co., Torrington, Ct.
Hendley Mch. Tool Wks., Richmond, Ind.
Hill, Clarke & Co., Boston, Mass.
Ingersoll Milling Machine Co., Rockford, Ill.
Johnson, Israel H., Jr. & Co., Phila.
Jones & Lamson Mch. Co., Springfield, Vt.
Lodge & Davis Mch. Tool Co., Cincinnati, Ohio.
Lodge & Shipley Mch. Tool Works, Cincinnati, Ohio.
Lovengrove & Co., Philadelphia, Pa.
McCabe, J. J., 63 Cortlandt, N. Y.
Machine Supply Co., Rochester, N. Y.
McVillie, E. J. Mch. Co., Waterbury, Conn.
National Machinery Co., Tiffin, Ohio.
Newark Mch. Tool Works, Newark, N. J.
New Haven Mfg. Co., New Haven, Conn.
New York Mach's Depot, N. Y.
Niles Tool Wks., 138 Liberty St., N. Y.
Pedrick & Ayer, Philadelphia, Pa.
Pittsburgh Mfg. Co., Pittsburgh, Pa.
Place, Geo., 120 Broadway, N. Y.
Poole, Robt. & Son, Baltimore, Md.
Powell Planer Co., Worcester, Mass.
Pratt & Whitney Co., Hartford, Conn.
Prentiss Tool & Supply Co., N. Y.
Reed, Jos. B., Cairo, Ill.
Scranton Supply & Mchry. Co., Scranton, Pa.
Sellers, Wm. & Co., Phila.
Seyfert's Sons, L. F., Philadelphia, Pa.
Stephens, J. & Co., Cincinnati, O.
Stow Flexible Shaft Co., Ld., Phila.
Tomney, Frank, Philadelphia, Pa.
Wetherill, Robert & Co., Chester, Pa.
Wilson, W. A., Rochester, N. Y.
Woodruff Mfg. Co., Hartford, Conn.
- Machinery for Hardware Manufacture.**
Adt, Jno. & Son, New Haven, Conn.
Machine Mfrs. Co., Worcester, Mass.
Machine Tools—See Machinery.
Machine Work.
Angus, C. H., Albany, N. Y.
Machinists' Scales.
Coffin & Leighton, Syracuse, N. Y.
Starrett, L. S., Athol, Mass.
Machinists' Tools and Supplies.
Brown & Sharpe, Providence, R. I.
King, J. M. & Co., Waterford, N. Y.
Sellers, Wm. & Co., Phila.
N. Y. Mallet & Handle Works, N. Y.
- Mangers.**
Worthley's Broad Gauge Iron Stall Works, Boston, Mass.
- Manufacturing Sites.**
Illinois Central R. Co., Chicago, Ill.
- Measuring Tapes.**
Larkin Rule Co., Saginaw, Mich.
- Meat Cutters.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Metal.**
Fearing, Wm. S., 100 Chambers, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
Naylor & Co., 45 Wall, N. Y.
- Metal Brokers.**
American Metal Co., N. Y.
- Metalurgists.**
Britton, J. Blodgett, Phila.
- Metal Saws.**
Ehrhardt, Gastave & Sons, Pittsburgh, Pa.
Q & C Co., Chicago, Ill.
- Milk Cans and Trimmings.**
Shepard, Stan-y & Co., Buffalo, N. Y.
- Milling Machines.**
Brown & Sharpe, Providence, R. I.
Cin. Milling Mch. Co., Cincinnati, Ohio.
Crough, R. M. Tolland, Conn.
Ingersoll Milling Machine Co., Rockford, Ill.
Pedrick & Ayer, Phila., Pa.
- Mining Knives.**
Palmer Hdw. Mfg. Co., Troy, N. Y.
- Miner Lamps.**
Darby, Edw. & Sons, Phila., Pa.
Leonard, B. E., Scranton, Pa.
Leonard, T. F., Scranton, Pa.

Lookhart Iron & Steel Co., Pittsburgh, Pa.
 Potomac Rolling Mill Co., Paterson, N.J.
 Pottville Iron & Steel Co., Pottsville, Pa.
 Roberts, A. & P. & Co., Phila., Pa.
 Tudor Iron Works, St. Louis, Mo.
 The Phoenix Iron Co., Phila., Pa.
Shears and Saws.
 Ames Shear Co., Bridgeport, Conn.
 Heinichs, R. Sons Co., Newark, N. J.
Sheet Iron and Steel, Manufacturers of.
 Atlas Iron and Steel Co., Bridgeport, Conn.
 Cambridge Iron & Steel Co., Cambridge, Mass.
 Chase Bros., Pittsburgh, Pa.
 Moorehead-McCleane Co., Pittsburgh, Pa.
 Pierson & Co., 24-29 West St., N. Y.
 Reilly, John W., Fort Hunter P. O., Pa.
 Singer, Nimick & Co., Ltd., Pittsburgh, Pa.
 The Mahoning Valley Iron Co., Youngstown, O.
 The Waco Iron Co., Philadelphia.
 W. Dewees Wood Co., McKeesport, Pa.
Sheet Zinc.
 Mathlessen & Hegeler Zinc Co., La Salle, Ill.
Shelf Brackets.
 Koch, A. B. & Co., Peoria, Ill.
Shipping Blanks.
 Barlow Bros., Grand Rapids, Mich.
Shovels, Spades and Scoops.
 Ros., A. M. & Co., Mon. N. Y.
Shutter Workers.
 Tyson & Zimmerman, Frederick, Md.
Sinks.
 Douglas, W. & B., Middletown Conn.
Skates.
 Dame, Stoddard & Kendall, Boston, Mass.
 Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
Skates, Roller.
 Henley, M. C., Richmond, Ind.
 Union Hardware Co., Torrington, Conn.
 Winslow Sam'l, Skate Mfg. Co., Worcester, Mass.
Skylights.
 Plenty Horticultural & Skylight Wks., 145 Liberty St., N. Y.
Smelting Works.
 Reeves, Paul S., 760 S. Broad, Phila.
Smoking Tubes.
 Ostrander, W. R. & Co., N. Y.
 Wollensak, J. F., Chicago, Ill.
Specialties, Pat. Articles.
 Knigsbrow, O., Cleveland, O.
Speed Indicators.
 Church & Sleight, 103 Fulton St., N. Y.
Speer.
 Mathlessen & Hegeler Zinc Co., La Salle, Ill.
Spoons and Forks.
 Holmes & Edwards Silver Co., Bridgeport, Conn.
 Rogers, The Wm. Mfg. Co., Hartford, Conn.
Souring Goods.
 Bartley & Graham, 313-315 B'way, N.Y.
Springs.
 Am. Spiral Spring Co., Pittsburg, Pa.
 Dunbar Bros., Bristol, Conn.
 Haley Mfg. Co., Concord, N. H.
 Miller & Van Winkle, Brooklyn, N. Y.
 Morgan Spring Co., Worcester, Mass.
 Quinn, Fred, 168 W. 27th St., N. Y.
 Sabin Machine Co., Montpelier, Vt.
 Tuck Mfg. Co., Brockton, Mass.
 Washburn & Moen Mfg. Co., Worcester, Mass.
 Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Spring Hinges.
 Barker, Ed. & 151 Baxter St., N.Y.
 Fullman Sash Balance Co., Rochester, N. Y.
 Shepard Hdw. Co., Buffalo, N. Y.
 Stover Mfg. Co., Freeport, Ill.
 Van Wagoner & Williams Co., 14 Warren St., N. Y.
Spunk Keys and Cotters.
 Tencks Mfg. Co., Pawtucket, R. I.
 Whitman & Barnes Mfg. Co., Syracuse, N. Y.
Sprinklers.
 Smith, Oliver A., Clarkston, Mich.
Stamped Ware.
 Am. Stamping Co., 104 & 106 John St., New York.
Stamping Works.
 Avery Stamping Co., Cleveland, O.
 Cleveland Stamping & Tool Co., Cleveland, O.
Staples.
 Chapin & Drew, Plymouth, Mass.
 Fitcher, R. H. & Co., Binghamton N.Y.
Steam Gauges.
 Ashcroft Mfg. Co., 111 Liberty St., N.Y.
 Bristol's Mfg. Co., Waterbury, Conn.
Steam Hammers, &c., Makers of.
 Diebolt & Eisenhardt, Philadelphia.
 Dudgeon, Richard, 24 Columbia Street, N. Y.
Steam Heating.
 Webster Warren & Co., Phila., Pa.
Steam Separators.
 Goubert Mfg. Co., 32 Cortland St. N. Y.
 Harrison Safety Boiler Wks., Phila., Pa.
Steel Balls.
 Grant Anti-Friction Ball Co., Fitchburg, Mass.
Steel Cold Rolled Strip.
 Wilmut & Hobbs Mfg. Co., Bridgeport Conn.
Steel Figures and Alphabets.
 Krogsrud, W., 61 Fulton, N. Y.
Steel Importers.
 Abbott, Jere & Co., N. Y. and Boston.
 Brown, Francis, Seaman & Co., 97 John St., N. Y.
 Jessop, Wm. & Sons, Sheffield, Eng. land, or 91 John, N. Y.
 Milne, A. & Co., 1 Broadway, N. Y.
 Newton & Shipman, 83 John, N. Y.
 Wetherell Bros., 83 Liberty St., N. Y.
 Wolf, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Steel (Mushet's Special).
 Jones, B. M. & Co., Boston.
Steel Manufacturers.
 Atlas Iron & Steel Co., Bridgeport, O.
 Babcock Iron Co., S. Bethlehem, Pa.
 Boker, Herman & Co., 103 Duane St.
 Buffalo Steel Foundry, Buffalo, N. Y.
 Carbon Steel Co., Pittsburgh, Pa.
 Chester Steel Castings Co., Phila., Pa.
 Chrome Steel Works, Brooklyn, N. Y.
 Crescent Steel Co., Pittsburgh, Pa.
 Franklin Steel Co., Philadelphia.
 Grant Iron Department or Cambridge Iron Co., Johnstown, Pa.
 Hobson, Francis, Seaman & Co., 97 John St., N. Y.

- Illinois Steel Co., Chicago, Ill.**
 Jessop, Wm. & Sons, Sheffield, Eng.
 Jones, B. M. & Co., Boston, Mass.
 Kayser, Ellison & Co., Sheffield, Eng.
 La Belle Steel Co., Pittsburgh, Pa.
 Lukens Iron & Steel Co., Coatesville, Pa.
 Moorhead-McCleane Co., Pittsburgh, Pa.
 Moss, F. W., 88 John St., N. Y.
 Taylor & Co., 45 Wall, N. Y.
 Pennsylvania Steel Co., Steelton, Pa.
 Pierson & Co., 24-27 West, N. Y.
 Pottsville Iron and Steel Co., Pottsville, Pa.
 Reilly, J. W., Fort Hunter P. O., Pa.
 Rowland, Wm. & Harvey, Frankford, Philadelphia.
 Singer, Nimitz & Co., Pittsburgh.
 Stanley Works, New Britain, Conn.
 Steel & Iron Improvement Co., Pittsburgh, Pa.
 Taylor Iron & Steel Co., High Bridge, N. J.
 Wordlaw, S. & Co., Sheffield, Eng.
 Wetherell Bros., 53 Liberty, N. Y.
 Wilcox & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Manufacturers' Agents.**
 Barnes, C. K. & Co., Philadelphia, Pa.
 Corning, Edw. & Co., 29 B'way, N. Y.
 Lindsay, Jas. G. & Co., Phila., Pa.
- Steel Rails, Manufacturers of.**
 Bethlehem Iron Co., S. Bethlehem, Pa.
 Cambria Iron Co., Johnstown, Pa.
 Illinois Steel Co., Chicago, Ill.
 Penna. Steel Co., Steelton, Pa.
 Monitor Iron & Steel Co., Danville, Pa.
 Riversdale Iron Wks., Wheeling, W. Va.
Steel Spiral Springs, Manufacturers.
 Chatillon, John & Sons, N. Y.
 Roland, Wm. & Harvey, Frankford, Pa.
 Wolff, R. H. & Co., Ltd., 118 Street and Harlem River, N. Y.
- Steel Tools.**
 Frankfort Steel Co., Philadelphia, Pa.
 Jessop, Wm. & Sons, Sheffield, Eng.
 Land, 91 John, N. Y.
 La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders.**
 Bicycle Step Ladder Co., Chicago, Ill.
 Croissant, M., Albany, N. Y.
- Steeles and Dies.**
 Armstrong Mfg. Co., Bridgeport, Conn.
 Billings & Spencer Co., Hartford, Conn.
 Butterfield & Co., Derby Line, Vt.
 Hart Mfg. Co., Cleveland, O.
 Saunders' Sons, D., Yonkers, N. Y.
 Wells Bros. & Co., Greenfield, Mass.
 Wiley & Russell Mfg. Co., Greenfield, Mass.
- Storage.**
 Security Warehouses, E. St. Louis, Ill.
- Stove Linings.**
 Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**
 Cheney, S. & Son, Manlius, N. Y.
- Stove Trimmings.**
 Troy Nickel Works, Troy, N. Y.
- Street Lamps.**
 Dietz, R. E. Co., 60 Lighthouse St., N. Y.
 Steam Gauge & Lantern Co., Syracuse, N. Y.
- Strops.**
 Electric Outlery Co., 113 Chambers, N. Y.
 J. R. Torrey & Co., Worcester, Mass.
- Spropping Machines.**
 Schmitz, E. Lothar, 92 Reade St., N. Y.
- Structural Iron Work.**
 Berlin Iron Bridge Co., East Berlin, Conn.
 Boston Bridge Wks., Boston, Mass.
 Lindsay, Jas. G. & Co., Phila., Pa.
 Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
 Matthews & Hegeler Zinc Co., La Salle, Ill.
- Tack Hammers.**
 Smethport Mch. Co., Ltd., Smethport, Pa.
- Tacks, Brads, Staples, &c.**
 Atlas Tack Corporation, Boston, Mass.
 A. Field & Sons, Taunton, Mass.
 Cobb & Drew, Plymouth, Mass.
 Grand Crossing Tack Co., Grand Crossing, Ill.
 Nat. Screw & Tack Co., Cleveland, O.
 Phillips, E. & Sons, South Hanover, Plymouth Mills, Plymouth, Mass.
 Trufant, W. E., Whitman, Mass.
- Taps and Dies.**
 Fatterfield & Co., Derby Line, Vt.
 Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
 Manning, Maxwell & Moore, 111 Liberty St., N. Y.
- Wells Bros. & Co., Greenfield, Mass.**
 Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
 Kiehle Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
 Kiehle Bros. Testing Mch. Co., Phila.
 Theoretical Hardware.
 Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
 Frost Thill Spring Co., Boston, Mass.
 Sabin Machine Co., Montpelier, Vt.
- Time Record.**
 Scattergood, H. W., Phila., Pa.
- Tinners' Hardware.**
 Berger Bros., Philadelphia, Pa.
- Tinning Processes.**
 Sandis, Thomas, Nashua, N. H.
- Tin Plate Machinery.**
 Lloyd Booth Co., Youngstown, Ohio.
- Tinware.**
 Am. Stamping Co., 104 & 106 John St., Matthal, Ingram & Co., Baltimore, Md.
 Tire Upsetters.
 Burns & Ordway, Boston, Mass.
 Illinois Iron & Bolt Co., Carpenterville, Ill.
- Tool Chests.**
 Am. Tool Co., 200 W. Houston St., N. Y.
 Jennings C. E. & Co., 97 Chambers St., N. Y.
- Tools.**
 Atkins, E. C. & Co., Indianapolis, Ind.
 Britton, Horace E., Stoughton, Mass.
 Brown, E. H. & Co., New Haven, Conn.
 Chamrell Tool Co., Reading, Pa.
 Cincinnati Tool Co., Cincinnati, O.
 Fray, John & Co., Bridgeport, Conn.
 Jennings, C. E. & Co., 97 Chambers, N. Y.
 Krauter & Co., Newark, N. J.
 Mayhew, H. H. Co., Shelburne Falls, Mass.
 Millers Falls Co., 93 Reade St., N. Y.
 Richardson, C. F. & Son, Athol, Mass.
 Standard Tool Co., Bridgeport, Conn.
 Stanley Rule & Level Co., 29 Chambers, Starrett, L. S., Athol, Mass.
 Tower & Lyon, 95 Chambers St., N. Y.
- Tools, Blacksmith and Wheelwrights.**
 Buffalo Forge Co., Buffalo, N. Y.
 Butte & Ordway, Boston, Mass.
 Champion Blower & Forge Co., Lancaster, Pa.
 Illinois Iron & Bolt Co., Carpenterville, Ill.
 Plumb, Fayette R., Philadelphia, Pa.
 Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tool, Steam and Gas Fitters.**
 Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasoline.**
 Danzler Stove & Mfg. Co., Cleveland, O.
 Schneider & Trenkamp Co., Cleveland, Ohio.
- Transom Lifters.**
 Buffalo Forge Co., Buffalo, N. Y.
- Tricycles.**
 Pierce, Geo. N. & Co., Buffalo, N. Y.
- Trucks, Manufacturers of.**
 Berger Bros., Philadelphia, Pa.
 Boston & Lockport Block Co., Boston, Mass.
 Mass. and Lockport, N. Y.
 Clark, P. & Sons, Locks, Conn.
 Lansing Wheelbarrow Co., Lansing, Mich.
- Tubes, Seamless Drawn Copper.**
 Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
 Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
 Shelby Steel Tube Co., Shelby, O.
- Tamping Barrels.**
 Henderson Bros., Waterbury, Conn.
- Tarnbuckles.**
 Central Iron & Steel Co., Brazil, Ind.
 Cleveland City Forge and Iron Co., Cleveland, Ohio.
 Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
 Cleveland Twist Drill Co., Cleveland.
 Graham Twist Drill & Chuck Co., Detroit, Mich.
 Morse Twist Drill & Machine Co., New Bedford, Mass.
 New Process Twist Drill Co., Taunton, Mass.
 Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**
 Chapman Valve Mfg. Co., Boston.
 Jenkins Bros., 71 John, N. Y.
 Lunkenheimer Co., Cincinnati, Ohio.
 McNab & Hartin Mfg. Co., 56 John N. Y.
 Mason Regulator Co., Boston, Mass.
- Ventilating Fans.**
 Huylet & Smith Mfg. Co., Detroit, Mich.
- Ventilator Appliances.**
 Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
 Newark Mch. Tool Co., Newark, N. J.
- Vises.**
 Hollands Mfg. Co., Erie, Pa.
 Howard Iron Works, Buffalo, N. Y.
 Prentiss Vise Co., 44 Barclay N. Y.
 Tower & Lyon, 95 Chambers St. N. Y.
 Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Wagon Jacks.**
 Boston & Lockport Block Co., Boston, Mass.
 Lockport, N. Y.
 Covert Mfg. Co., West Troy, N. Y.
 Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
 Haslam, Wm. H. Co., Pawtucket, R. I.
 Lashman, E. B., Columbus, Ohio.
 Miter Mfg. Co., Milton, Pa.
 Stribner, J. H. & Son, Reading, Pa.
- Washing Machines.**
 Diether & Barrows, Ft. Wayne, Ind.
 Huenefeld, E. H., Cincinnati, Ohio.
 Union Mfg. Co., Toledo, O.
 Wayne A. Mfg. Co., Ft. Wayne, Ind.
- Water Meters.**
 Walting, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
 Pole, Robt. & Son Co., Baltimore, Md.
- Weed Destroyer.**
 Shaw & Clancy, Racine, Wis.
- Well Boring Machines.**
 City Well Boring Co., Pittsburgh, Pa.
- Well Machinery.**
 Amer. Well Works, Aurora, Ill.
- Wheels.**
 Arnold Metal Wheel Co., New London, O.
- Wheelbarrows.**
 Akron Tool Co., Akron, O.
 Steel Scrap Co., Sidney, Ohio.
 Cockburn Barrow & Mch. Co., Jersey City, N. J.
 Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
 Lansing Wheelbarrow Co., Lansing, Mich.
 Sidney Steel Scrap Co., Sidney, O.
 Sweeney Mfg. Co., Minneapolis, Minn.
 Toledo Wheelbarrow Wks., Toledo, O.
- Whips.**
 American Whip Co., Westfield, Mass.
- Window Cord, Makers of.**
 Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
 City Wire Nail Co., Pittsburgh, Pa.
 Amer. Wire Nail Co., Anderson, Ind.
 Consolidated Steel & Wire Co., St. Louis, Mo.
 Eastwood Wire Mfg. Co., Belleville, N. J.
 Gaudier Steel Department of Cambria Iron Co., Johnstown, Pa.
 Haler Mfg. Co., Concord, N. H.
 Miller & Van Winkle, Brooklyn, N. Y.
 New Castle Wire Nail Co., New Castle, Pa.
 New Haven Wire Mfg. Co., New Haven, Conn.
 Prentiss, Geo. & Co., Holyoke, Mass.
 Salem Wire Nail Co., Salem, N. J.
 Trenton Iron Co., Trenton, N. J.
 Washburn & Moen Mfg. Co., Worcester, Mass.
 Wetherell Bros., 93 Liberty St., N. Y.
 Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
 Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
 Barnum, E. T., Detroit, Mich.
 Clinton Wire Cloth Co., Clinton, Mass.
 Darby, Edward & Sons, Philadelphia.
 Eastwood Wire Mfg. Co., Belleville, N. J.
 Edley, W. S., 65 Fulton, N. Y.
 Gilbert & Bennett Mfg. Co., 42 Cliff.
 Howard & Morse, 45 Fulton, N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.
 Reliance Wire Wks. Co., Milwaukee, Wis.
 Scheeler & Sons, Buffalo, N. Y.
 Wickwire Bros., Cortland, N. Y.
 Wright & Colton Wire Cloth Co., Worcester, Mass.
 W. S. Twist Wire Works Co., Cleveland.
- Wire Cutters.**
 Cronk Hanger Co., Elmira, N. Y.
 King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
 McFarland, Wm., Trenton, N. J.
 Newton & Shipman, 83 John, N. Y.
- Wire Door Mats.**
 Hartman Mfg. Co., Beaver Falls, Pa.
 The Wire Goods Co., Worcester, Mass.
- Wire Fences.—See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**
 Darby, Edward & Sons, Philadelphia.
 Gilbert & Bennett Mfg. Co., N. Y.
 E. Jenck Mfg. Co., Pawtucket, R. I.
 Lang's Fence & Wire Co., St. Louis, Mo.
 Ludlow-Saylor Wire Co., St. Louis.
 Ossawan Mills Co., Norwich, Conn.
 Scheeler & Sons, Buffalo, N. Y.
 Whitman & Barnes Mfg. Co., Syracuse, N. Y.
- Wire Goods Co., Worcester, Mass.**
 Wickwire Bros., Cortland, N. Y.
 Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
 Am. Tool Wks., Cleveland, O.
 Manville, E. J. Mch. Co., Waterbury, Conn.
 Morgan Construction Co., Worcester, Mass.
 Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**
 Add, John & Son, New Haven, Conn.
- Wire Nails.**
 Amer. Wire Nail Co., Anderson, Ind.
 Backus Wire Nail Co., Cleveland, O.
 Consolidated Steel & Wire Co., St. Louis, Mo.
 Field, A. & Sons, Taunton, Mass.
 Indiana Wire Fence Co., Crawfordsville, Ind.
 Klineberg Co., Newburg, N. Y.
 New Castle Wire Nail Co., New Castle, Pa.
 Phillips, E. & Sons, South Hanover, Mass.
 Phillips, Townsend & Co., Phila., Pa.
 Plymouth Mills, Plymouth, Mass.
 Salem Wire Nail Co., Salem, O.
 Whitney, A. H. & Co., New York City.
- Wire Rods, Steel.**
 Amer. Wire Nail Co., Anderson, Ind.
 Consolidated Steel & Wire Co., St. Louis, Mo.
 Illinois Steel Co., Chicago, Ill.
 New Castle Wire Nail Co., New Castle, Pa.
- Wharfburn & Moen Mfg. Co., Worcester, Mass.**
 Whitney, A. R. & Co., 17 B'way, N. Y.
 Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel Makers.**
 Broderick & Bascom Rope Co., St. Louis, Mo.
 California Wire Works, San Francisco.
 Hazard Mfg. Co., Wilkesbarre, Pa.
 A. Leschen & Sons Rope Co., St. Louis.
 Trenton Iron Co., Trenton, N. J.
 Washburn & Moen Mfg. Co., Worcester, Mass.
 Williamsport Wire Rope Co., Williamsport, Pa.
- Wire, Spool.**
 Mallin & Co., Cleveland, O.
- Woodenware.**
 Tucker & Dorsey Mfg. Co., Indianapolis, Ind.
- Wood-Working Machinery.**
 Fay, J. A., & Egan Co., Cincinnati, O.
 Sebastian Lathe Co., Cincinnati, Ohio.
 Sebastian, May & Co., Sidney, O.
 Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrapping Paper.**
 Amer. Roll Paper Co., St. Louis, Mo.
- Wrenches, Manufacturers of.**
 American Saw Co., Trenton, N. J.
 Bemis & Call Hardware & Tool Co., Springfield, Mass.
 Billings, Spencer & Co., Hartford, Conn.
 Capitol Mfg. Co., Chicago, Ill.
 Central Iron & Steel Co., Brazil, Ind.
 Coes Wrench Co., Worcester, Mass.
 Gendron Iron Wheel Co., Toledo, O.
 Keystone Mfg. Co., Buffalo, N. Y.
 Portsmouth Wrench Co., Boston, Mass.
 St. Louis Wrench Co., St. Louis, Mo.
 Tower & Lyon, 95 Chambers St., N. Y.
 Truitt Mfg. Co., Roxbury, Mass.
 Williams, J. H., Brooklyn, N. Y.
- Wringers.**
 Colby Wringer Co., Montpelier, Vt.

See Alphabetical Index, Page 150.

THE IRON AGE.

The oldest paper in the world devoted to the interests of the Hardware, Iron and Metal Trades, and a standard authority on all matters relating to those branches of industry.

RATES OF SUBSCRIPTION:

INCLUDING POSTAGE.

UNITED STATES AND BRITISH AMERICA.

Weekly Edition, Issued every THURSDAY MORNING,	\$4.50 a year.
Semi-Monthly Edition, FIRST and THIRD THURSDAYS of every month,	2.30 "
Monthly Edition FIRST THURSDAY of every month,	1.15 "

ALL OTHER COUNTRIES.

Per Annum, Postpaid.

Weekly Edition: \$5.00=£1=25 francs=20 marks=11 florins=6 roubles (coin)=25 lire=20 pesetas.
Semi-Monthly Edition: \$2.50=10/-=12½ francs=10 marks=6 florins=3 roubles (coin)=12½ lire=10 pesetas.
Monthly Edition: \$1.25=5/-=6¼ francs=5 marks=3 florins=1½ roubles (coin)=6¼ lire=5 pesetas.

RATES OF ADVERTISING:

ONE SQUARE (12 LINES, ONE INCH).

ONE INSERTION	\$2.00	SIX MONTHS,	\$30.00
ONE MONTH,	7.50	ONE YEAR,	50.00
THREE MONTHS,	17.50	Rates for larger spaces quoted on application.	
New York (Main Office),	96-102 Reade Street,	DAVID WILLIAMS, Publisher.	
Philadelphia,	220 South Fourth Street,	THOMAS HOBSON, Manager.	
Pittsburgh,	Room 509, Hamilton Building.	ROBERT A. WALKER, Manager.	
Chicago,	59 Dearborn Street, cor. Randolph,	J. K. HANES, Business Manager.	
Cincinnati,	Rooms 22-24 Pickering Building,	GEO. W. COPE, Resident Asso. Ed.	
St. Louis,	Bank of Commerce Building,	HENRY SMITH, Manager.	
Boston,	146 Franklin Street,	H. H. ROBERTS, Manager.	
Cleveland,	312 The Cuyahoga,	WALTER C. ENGLISH, Manager.	
		EZRA S. ADAMS, Manager.	

BRITISH AGENCY: Office of The Ironmonger, 42 Cannon St., London.

Remittances should be made by draft, payable to the order of DAVID WILLIAMS, on any banking house, a the United States or Europe, or by P. O. Money Order on New York. When these cannot be obtained, postage stamps of any country will be received.

Newsdealers or Bookellers in any part of the world may obtain The Iron Age through The American News Company, New York, U. S. A. The International News Company, New York, U. S. A. and London, England; or The San Francisco News Company, San Francisco, Cal., U. S. A.

Entered at the Post Office, New York, as Second-Class Matter.

ALPHABETICAL INDEX
TO ADVERTISERS.

Abbott, Jere & Co.	20	Champion Mfg. Co.	140	Gendron Iron Wheel Co.	106	Le Count, C. W.	136	Pennsylvania Mch. Co.	78	Standard Horse Shoe Co.	130
Acme Sheet	30	Chantrell Tool Co.	94	Gibbs Mfg. Co.	139	Lee, Jesse & Sons	101	Pennsylvania Steel Co.	21	Standard Steel Casting Co.	152
Adair, John & Son	43	Chapin Cutlery Co.	94	Gilbert & Bennett Mfg. Co.	9	Leechburg Fdry & Mch. Co.	25	Perkins, H. H. Mfg. Co.	87	Standard Tool Co.	62
Alken, Henry	30	Chapman Valve Mfg. Co.	152	Gleason Tool Co.	42	Leffell, W. C. Co.	42	Perry, W. H. & Co.	76	Standard Tool Co.	62
Alkron Tool Co.	138	Chastillon, John & Sons	135	Glendon & Krause	143	Leggett & Bro.	48	Phila. Iron Works Co.	28	Stanley Rule & Level Co.	151
Alexander Bros.	43	Cherry, J. R.	26	Goodell & Harding	113	Leffler, C. E. & Co.	81	Phillips, A. & Sons	117	Stanley Works	85
Alford & Berkele Co.	108	Chess Bros.	26	Goubert Mfg. Co.	39	Leonard, B. E.	135	Phillips, C. & Co.	12	Stark Mch. & Tool Co.	54
Allentown Rolling Mills	52	Chester Steel Casting Co.	27	Gould & Eberhardt	44	Leonard, J.	83	Phoenix Iron Works Co.	18	Starrett, L. S.	91
Almond, T. R.	52	Chicago Foundry Co.	28	Graham, John H. & Co.	119	Leonard, T. F.	135	Phoenix Iron Works Co.	18	Steam Gauge Lantern Co.	84
American Axe & Tool Co.	97	Chicago Fdry. Supply Co.	31	Graham, Passmore & Co.	140	Leuschen, A. & Sons	80	Phoenix Iron Works Co.	18	Sears, E. C. & Co.	82
Am. Bit Brace & Tool Co.	103	Christy Knife Co.	98	Graham, Twist Drill & Co.	140	Levis, Henry & Co.	23	Phoenix Iron Works Co.	18	Seabright, Charles J.	17
Am. Bolt Co.	144	Chrome Steel Works	26	Chuck Co.	42	Levenson Mfg. Co.	153	Phoenix Iron Works Co.	18	Seabright, Charles J.	17
Am. Curry Comb Co.	128	Church, Slight	132	Grand Rapids Hand Screw	102	Lindsay, J. G. & Co.	52	Pierce, Geo. N. & Co.	111	Seabright, Charles J.	17
Am. Metal Co.	4	Cincinnati Milling Mch. Co.	70	Grand Rapids Refrigerator	114	Link-Belt Engineering Co.	19	Pierson & Co.	25	Seabright, Charles J.	17
Am. Pig Iron & Storage	16	Cincinnati Mfg. Co.	111	Grant Anti-Friction Ball	71	Lockhart Iron & Steel Co.	29	Pike Mfg. Co.	68	Seabright, Charles J.	17
Am. Roll Paper Co.	113	Cincinnati Tool Co.	108	Grant Corundum Wheel	56	Lodge & Shipley Machine	72	Pilling & Crane	10	Seabright, Charles J.	17
Am. Saw Co.	136	Claiborn Mfg. Co.	44	Grant Corundum Wheel	56	Lodge & Shipley Machine	72	Pittsburgh I. & S. Eng. Co.	34	Seabright, Charles J.	17
Am. Screw Co.	14	Clegg, Geo. M.	76	Grant Corundum Wheel	56	Long & Lister Co.	71	Pittsburgh Reduction Co.	82	Seabright, Charles J.	17
Am. Spiral Spring Co.	4	Clark Mfg. Co.	128	Grant Corundum Wheel	56	Lowell, Jno. P. Arms Co.	69	Place, Geo.	76	Seabright, Charles J.	17
Am. Stamping Co.	103	Clark, W. J. & Co.	100	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Am. Steel Scraper Co.	138	Cleveland Block Co.	133	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Am. Tool Co.	73	Cleveland City Forge & Iron Co.	1	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Am. Tool Works	73	Cleveland Foundry Co.	102	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Am. Well Works	42	Cleveland Stamping & Tool Co.	120	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Am. Whip Co.	151	Cleveland Stone Co.	65	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Am. Wire Nail Co.	12	Cleveland Twist Drill Co.	62	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Ames Sward Co.	127	Cleveland & Hardwick	32	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Angus, C. H.	20	Clinton Wire Cloth Co.	9	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Ansonia Brass & Cop.	57	Cloagh, R. M.	57	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Arcade Malleable Iron Co.	26	Cock & Drew	15	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Armstrong Mfg. Co.	66	Machine Co.	141	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Arnold Metal Wre Co.	138	Coe, Loring & Co.	135	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Artificial Gas Eng'ng Co.	22	Coe, Wrentham Co.	135	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Aschcroft Mfg. Co.	38	Coffin & Leighton	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Ashe, J. A.	88	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Atlas Tack Corporation	16	Colby Wringer Co.	118	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Avery Stamping Co.	1	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Babcock & Wilcox Co.	41	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bader, Adamson & Co.	90	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Banker & White	127	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Barlow Bros.	87	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Barnes, C. K. & Co.	33	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Barnes, W. F. & John	52	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Barnett, G. & H.	91	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Barnum, E. T.	8	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Becker, Jno. Mfg. Co.	42	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Belmont, A. H.	68	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bell, Geo. E. & Co.	68	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bellevue Pump Co.	87	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bement, Miles & Co.	55	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bemis & Call Hdw. & Tool	134	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Berger Bros.	134	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Berlin Iron Bridge Co.	17	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Berryman, Jas.	39	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bertsch & Co.	46	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bethlehem Iron Co.	23	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bettendorf Hollowsteel	81	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Biegelow, C. E.	75	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bignall & Keeler Mfg. Co.	50	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Billings & Spencer Co.	134	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Billington, J. H. & Co.	98	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bingham, W. & Co.	108	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Birmingham Iron Fdry	141	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bishop Mfg. Co.	141	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Blake & Johnson	12	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bliss Co. E. W.	45	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Boardman, L. & Son	95	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bogert, John L.	70	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Boger, Hermann & Co.	20	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Boone, W. C. Mfg. Co.	25	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Borden & Lovell	17	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Borner, Cyrus	29	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Boston Bridge Works	17	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Boston Gear Works	39	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Boston & Lockport Block Co.	128	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Box, Alfred	68	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bradford & Plummer	68	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bradford Mill Co.	68	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bradley & Co.	18	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bradley & Co.	47	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bradley Fertilizer Co.	51	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brady Mfg. Co.	69	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brass Goods Mfg. Co.	98	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brass Goods Mfg. Co.	103	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bridgeport Gun Implement Co.	62	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Briggs, Marvin	74	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bristol Mfg. Co.	1	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brittan Graham & Mathies	123	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Britton, Horace E.	125	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brock, J. Edgar	32	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brock & Bascom Rope Co.	6	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bronson Supply Co.	120	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brown, E. E. & Co.	127	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brown Holstein & Conveying Machine Co.	43	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brown, H. C.	84	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Brown & Sharpe Mfg. Co.	72	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bryden Horse Shoe Co.	130	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buck Bros.	93	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buckeye Churn Co.	120	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buckeye Engine Co.	39	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buckeye Mfg. Co.	120	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buffalo Forge Co.	69	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buffalo Scale Co.	131	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buffalo Engine Tool Wks.	92	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Buffalo Specialty Mfg. Co.	91	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Bullock Bellows Co.	56	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Burdett Iron Co.	130	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Burditt & Williams	65	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Burgess & Loxley	105	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76	Seabright, Charles J.	17
Burgess Soldering Fce. Co.	105	Colburn, A. L.	56	Grant Corundum Wheel	56	Lovell Mfg. Co. Ltd.	74	Place, Geo.	76		

BRADLEY HAMMERS.

If you plate, draw, square, taper, swage, collar, spindle or do any manner of die forging in iron or steel, a Bradley Hammer will soon pay for itself by what it will save over any other similar tool. Send for circulars.

BRADLEY & COMPANY, Syracuse, N. Y.

Hustler Jim Dandy } Bicycles.

Cheapest Pneumatic Cycles on the Market.

The most suitable wheels ever introduced for the hardware trade. Send for description and prices.

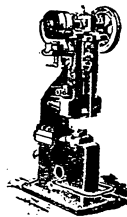
HULBERT BROS. & CO., 26 West 23d Street, New York City.

HACKNEY HAMMERS

Meet all requirements more fully and satisfactorily than any other of its competitors.

INVESTIGATION IS NOT COSTLY.
INVESTIGATION IS CONVINCING.

WRITE FOR CATALOGUE TO
THE HACKNEY HAMMER CO.
20 Johnson St., CLEVELAND, O.



HOWE BROS. & HULBERT'S
ARE NOW MADE BY
C. T. WILLIAMSON WIRE NOY. CO.,
NEWARK, New Jersey.

CORKSCREWS.

THE W.W. & R.M. KEYS CO.
BRIDGEPORT, CONN.

The Art of Selling

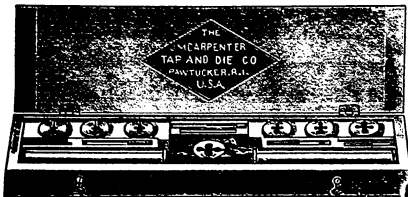
By F. B. GODDARD.

In this book the author lets the reader into the secrets of the accomplished and successful salesman, illustrates his tact and finesse and tells how he masters men. But beyond this, the work embraces much information which will be instructive and useful to all classes of business men, discusses fully the characteristic methods of conducting business to-day and makes an interesting application of character reading to the work of business negotiations

Price, 50 Cents.

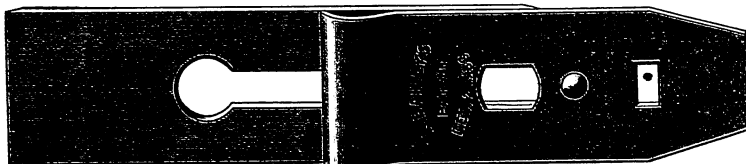
Sent, post-paid, on receipt of price by
DAVID WILLIAMS, 96-102 Reade St., N. Y

BABBITT METALS.

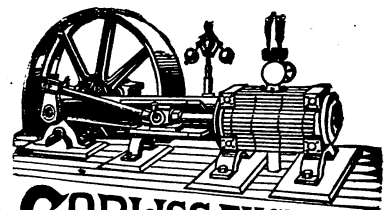


STANLEY'S PATENT IMPROVED PLANE IRONS

The improved form of this Plane Iron renders it unnecessary to detach the Cap-Iron at any time. The connecting screw will slide back to the end of the slot in the Plane Iron, without falling out; and the parts are thus always kept together, preventing any loss of time in hunting about a bench or shop floor for them. The Cap-Iron will serve as a convenient handle or rest, in sharpening the Plane Iron.



The circular enlargement of the slot in the Plane Iron being nearest the cutting edge, it can be safely tempered up to, or above, the lower side of the opening; as a perfect circle located at this point in the Plane Iron insures equal expansion and contraction of the metal. The owner can use this Iron up much closer than formerly, without liability of its being broken or cracked at the corners of the slot as heretofore formed.



CORLISS ENGINES
MACHINISTS
IRON FOUNDERS, BOILER MAKERS,
ROBT. WETHERILL & CO
CHESTER, PA.

NEW MAIL.

10th Year 1893 Model.



SPECIALLY ADOPTED BY
the HARDWARE TRADE.

CUSHION TIRES, - \$105.00.

PNEUMATIC TIRES, - 125.00.

Men's, Ladies' and Boys' Patterns.

SECURE AGENCY.

Also our line Cheap Wheels—The Best.

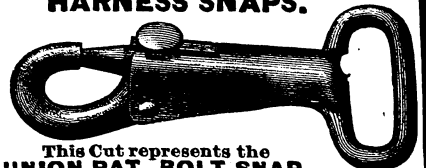
MANUFACTURERS:

WM. READ & SONS,
107 WASHINGTON ST., BOSTON, Mass.



MASON REGULATOR CO.,
BOSTON, MASS., U. S. A.

W. & E. T. FITCH,
NEW HAVEN, CONN.
Manufacturers of a variety of
HARNESS SNAPS.



This Cut represents the
UNION PAT. BOLT SNAP.

PAUL S. REEVES,
Philadelphia.

Phosphor Bronze

AND

BABBITT METALS.

Lead Lined Car Bearings a Specialty.

Brass and Phosphor Bronze Castings from ¼ pound to 20,000 pounds in weight.

STEEL CASTINGS
OPEN HEARTH STEEL
STANDARD STEEL CASTING CO.
THURLOW, PA.

MALLEABLE IRON

—AND—

STEEL CASTINGS.

PRATT & LETCHWORTH, BUFFALO, N. Y.

Orders and Correspondence Solicited.

ESTABLISHED

Spring Making, 1842.

Steel Making, 1845.


Norway Iron, 1871 (Re-Rolled).

WM. & HARVEY ROWLAND,
MANUFACTURERS OF

Springs, Steel, Re-Rolled Norway Iron & Slit Norway Nail Rods.

Address: FRANKFORD P. O., - PHILADELPHIA.

SAMSON
SPRING HINGE.



Hold-Back Pattern
The Only Hinge With
Self-Adjusting Gages
For Attaching. Extra
Heavy and Strong...

Sole Makers
Shepard Hardware Co.
Buffalo, N. Y.

See Advertisement, Page 829.

TUBES ¼" TO 1½" DIA. IN
STEEL WITH BUTTED JOINTS
NICKEL PLATING
AND
BRASS PLATING
AND
JAPANNING.
THE WILMOT & HOBBS MFG. CO.
(JOBGING DEPT.) BRIDGEPORT, CONN.

BUFFALO
BLOWERS



FOR CUPOLAS, FORGES,
FURNACES & EXHAUSTERS
STEAM FANS, HEATERS &
VENTILATING WHEELS

BUFFALO FORGE CO.
BUFFALO, N. Y.

STANLEY G. FLAGG & CO., Philadelphia, Pa.
Office and Works, N. W. Cor. 19th St. & Pennsylvania Ave.
Manufacturers of **STEEL CASTINGS,**
A Substitute for Steel and Wrought Forgings.
Circulars Sent on Application.

BUTCHER SAWS.

See Page 84.

MILLERS FALLS CO.

EUREKA CAST STEEL COMPANY.

Office and Works, Chester, Pa.
Open Hearth, Crucible and Eureka Steel Castings.
Railroad and Machine Castings.
Locomotive Cross-Heads and Gearing a Specialty.
Guaranteed Knuckles for M. O. B. Couplers.

SPRINGS AND AXLES
F. W. WURSTER
75 KENT AVE BROOKLYN N. Y.

New Full Mounted
Lightning Screw
Plate.
Send for Catalogue.



WILEY & RUSSELL MFG. CO., - Greenfield, Mass.

FRED NOURSE
315 E. 22ND ST. N. Y.
SPRINGS

LIDGERWOOD
HOISTING ENGINES.
300 styles and sizes. Over 9500 in use.
LIDGERWOOD MFG. CO., 96 Liberty St., N. Y.

JOHN SOMMER'S QUALITY
1X L^{INE} CORK LINED FAUCETS,
MADE OUT OF SELECTED ROCK SUGAR MAPLE
AND BOILED IN PURE LINSEED OIL.
ONLY THE GENUINE ARE STAMPED
IN THE WOOD
WITH OUR MARK TRADE MARK
JOHN SOMMER'S SON, MFR. 8-12 PEARL ST. NEWARK N. J.



JENNINGS'
Catalogue of
HIGH GRADE
Hand Saws
Is now ready.
Sent to the Trade on Application.
C. E. JENNINGS & CO.,
79 Reade and 97 Chambers Sts., N. Y.

RUSSELL, BURDSALL & WARD,
Portchester, N. Y.,

Manufacturers of

Carriage, Tire, Plow and Stove

BOLTS

Carriage Bolts made from Best Square Iron a
Specialty.

Solid Steel Castings

From Crucible and Open Hearth.

Steel and Gun Metal Rolls
Specialties.

Air Furnace Refined

Malleable Castings.

ISAAC C. JOHNSON & CO.,

ESTABLISHED 1853,


SPUYTEN DUYVIL, NEW YORK CITY.

**DOG COLLARS,
DOG MUZZLES.**

THE
CHAPMAN
MFG. CO.,
Meriden, Conn.



A. G. PECK & CO,
Cohoes, N. Y.
MANUFACTURERS OF
**AXES, ADZES,
BROAD AXES
HATCHETS.**
Send for Catalogue and
Price List.



GEM
SPRING
HINGES

FOR DOORS,		JAPANNED.	
Feet.	Inch.	Length of Flanges	No. of Hinges
6x2	¾ to 1 ¼	3 ½ in	63
7x2	1 to 1 ½	4 in	64
7x2 ½	1 to 1 ½	5 in	65
7x2 ½	1 to 1 ½	6 in	66
8x2 ½	1 ¼ to 1 ¾	7 in	67
8x3	1 ½ to 2 ¼	8 in	68
9x3	1 ¾ to 2 ½	10 in	69

FOR SCREEN, MEDIUM AND HEAVY DOORS.

Single and Double Acting.

THE 3 ½ AND 4 INCH
ARE THE BEST IN
THE MARKET FOR
SCREEN DOORS.



Send for full Catalogue of Bronzed, Brass and
Bronze Metal Spring Hinges.

MANUFACTURED BY

VAN WAGONER & WILLIAMS CO.

CLEVELAND, O. and 14 WARREN ST., N. Y.

Published by DAVID WILLIAMS, 96-102 Reade Street,
New York. Printed by THE WILLIAMS PRINTING
CO., General Book, Commercial and Newspaper
Printers and Binders, Nos. 96-102 Reade St.
New York.

THE IRON AGE

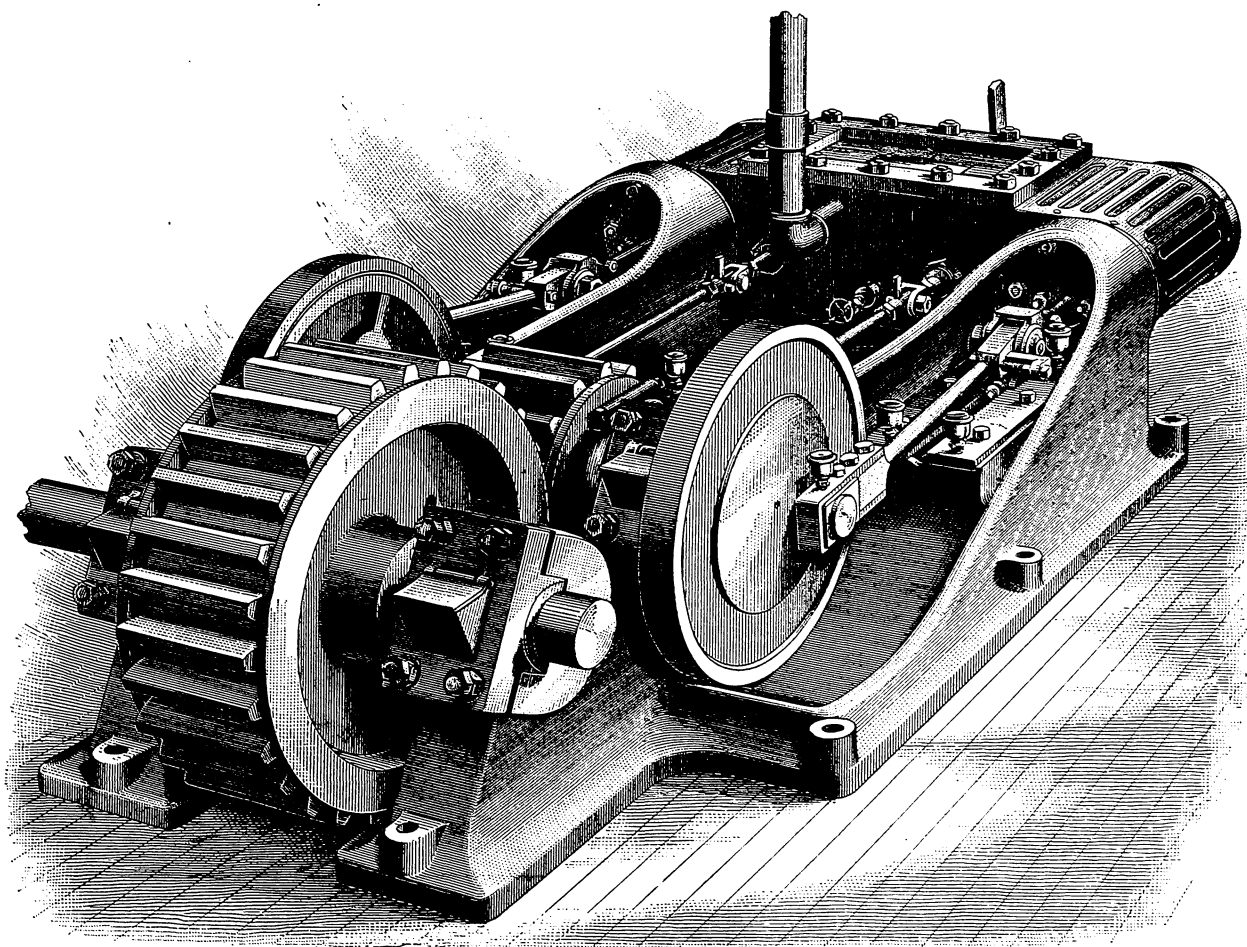
THURSDAY, APRIL 6, 1893.

The Crane Reversing Engines.

For many purposes the, ordinarily, prerequisite quality of economical steam consumption by an engine becomes of secondary importance as compared with promptness of action and durability, under certain disadvantageous conditions, which would render the use of a high duty engine a source of continual inconvenience and expense. In rolling mills, for instance, there is usually a multiplicity of engines of comparatively small powers, which are necessarily subjected to what may be considered pretty hard usage—

not but cause abrasion and lost motion to an extent which must seriously affect the action of an engine of ordinary construction. The link motion, for instance (or some of its numerous modifications), is one of the most generally used and efficient devices for reversing gear, and under ordinary conditions may be considered as entirely satisfactory. But its construction and principle of operation are such that it must suffer very rapid deterioration under each exposure, and the result must be an amount of lost motion which will seriously distort the motion of the slide valves, and thereby affect the efficiency of the engine, to say nothing of the expense and incon-

illustrated in the cuts and drawings shown. The greatest simplicity of construction consistent with efficient action seems to have been attained; and, incidentally, their cheapness of cost and maintenance is a not unimportant feature. The engine is intended to conform to, and not govern, the type of transmitting mechanism between it and the tables; and therefore quite an extensive line of styles and sizes has been found necessary to adapt it to the various devices used in different mills. Three of these styles are shown in the perspective views. Their general features of design are clearly indicated. The two engines, having quartered cranks, are en-



THE CRANE HORIZONTAL TWIN ENGINE.

that is, their working parts are exposed to the abrasive action of the dust and grit, and they are roughly handled, being started, stopped and reversed at full load as suddenly as the reverse lever or throttle can be shifted. They cannot well have, and therefore should not require, the more careful treatment they might receive at the hands of a skilled engineer, as they must be operated by a cheaper class of labor. Engines of the reversing type in particular must be capable of bearing without injury these sudden changes of load and direction, and they must also be able to respond promptly to all manipulations of the controlling mechanism. There is probably no situation in which these qualities are more truly essential than where the engine is used direct for operating the transfer tables of a heavy rolling mill. From their proximity to the rolls they are necessarily exposed to the flying grit, cinder and scale from the latter, which can-

convenience of the necessarily frequent repairs. Furthermore, as the engines are usually of small size in proportion to the power required to handle the tables and their load quickly they must run at a comparatively high rotative speed, which must be attained almost instantly after starting or reversal, and not gradually, as with engines for ordinary duties. This, of course, required them to be handled without changing the throttle, which is generally left wide open, and the starting and stopping accomplished by means of the reversing gear, with full boiler pressure on the back of the valves, which is manifestly very severe on the several bearings of the link motion, even were it possible to thoroughly protect them from the effects of their gritty surroundings.

In order to meet, rather than attempt to change, the conditions due to this trying duty, the Crane Elevator Company of Chicago have designed the type of engines

tirely self contained, and of a construction which insures sufficient strength and rigidity to enable them to develop their full power, without danger of springing, entirely independent of the foundation. In all cases, except of the largest sizes, the beds are formed of a single casting, as are also the housings of the vertical type. Likewise, the two cylinders are of one piece, being solidly connected by the interposed steam chest, common to both.

Fig. 1 shows the plain horizontal twin engine in which the bed plate is extended to carry the bearings for the shaft of the second gear. Fig. 2 is a front view of the vertical engine, showing the pinion and second gear, with bearings for shaft of the latter cast solid with main bed plate. The drawings—Figs. 3 and 4—show the constructive features of the horizontal engine, size 6 x 8 inches, as furnished to the South Works of the Illinois Steel Company. From an external view of these engines,

they could not be recognized as being of the reversing type, owing to the entire absence of any visible reversing mechanism. There it but a single fixed eccentric for each cylinder, which, together with its strap and rod, constitutes the entire valve motion—obviously, of itself, for one direction only.

Referring to the sectional drawings, Figs. 5, 6 and 7, however, we find the main slide valves, *o*, *o'*, to be of peculiar construction, and, also, a central supplementary valve *P*, operated by the hand-lever shown in the perspective cuts. This latter constitutes the reversing device, or at least the operative portion of it. By means of the ports *a* and *B'*, and passages *a* and *B*, the valve *P* changes the steam admission to the cylinders and also the exhaust, from passage *e* to cavity *i* of the main valve *o*, thereby reversing the two functions and consequently the direction of motion of the piston. To follow out the operation in detail, let us suppose the valve *P* to be adjusted by means of the hand lever so that its exhaust cavity *d*, Fig. 7, will connect ports *B'* and *C*. This will leave port *a'* and passage *a* open to the steam with which the steam chest is filled. By Fig. 5 we see that the passage *e* in the main valve *o'* establishes communication between *a* and cylinder port *c*, thereby admitting steam to the cylinder in front of piston, while at the same time the exhaust is taking place from opposite side of the latter, through port *c'*, cavity *i*, passage *B*, port *B'*, valve cavity *d*, and thence through exhaust port *C* to the exhaust pipe.

If we now reverse the position of valve *P*, so that cavity *d* connects *a* and *c*, the steam will be admitted to valve *o'* through *B'* and *B* and the cavity *i*, which, instead of being the exhaust, becomes the admission connection; while the release is effected through the passages and connections which previously performed the function of admission, and, consequently, the motion of the piston is reversed. By adjusting the position of reversing valve *P* with relation to ports *a'* or *B'*—through which ever the admission is taking place—the regulation of speed is attained, and the valve therefore performs the additional function of throttle. Of course, under very light load, the width of opening will be so slight as to cause very considerable wire drawing, but this is of little importance from the fact that such conditions of load are exceptional or only for short intervals. It will be observed that the full area of the reversing valve is exposed to the steam pressure, which, in the larger sizes, would render it difficult to move by hand with a sufficiently quick acting device. For all such sizes the valve is covered by a simple balancing plate which is so proportioned as to leave only so much of the valve area exposed to unbalanced pressure as is necessary to keep it firmly seated and prevent leakage.

From the foregoing it is obvious that the essential qualities of reliable efficiency, quickness of action, simplicity of construction and durability against wear, regardless of external conditions, have been attained in an admirable degree; as, also, the cheapness of cost, as compared with that of the ordinary types of reversing engines. The handling of transfer tables is but one of the many purposes for which the engines are used. They are equally adapted to all duties of moderate powers in which reversing is necessary. For elevator service, using steam power direct, there are a large number now in use, and, in fact, it was for this especial duty that the engines were originally designed.

Americans are fond of believing that the big trees of California are the largest in the world. That this is not the case has often been shown, and a writer in *Science*

has taken the pains to do so again. The highest of the big California trees is 325 feet high and has a circumference near the ground of 45 feet; another measures 321 feet in height, has a girth of 90 feet and a diameter of about 30 feet. The Eucalyptus, or gum tree, of Australia, however, sometimes attains a height of 400 feet and over; one which was cut recently at Cape Otway was 415 feet high and 15 feet in diameter near the ground; another had a girth of 69 feet at its base, at 12 feet from the ground it had a diameter of 14 feet, at 78 feet from the ground the diameter was 9 feet, at 144 feet it was 8 feet, and at 210 feet from the ground it was 5 feet. Some of these trees commence to branch at 300

1891-92 were \$8,447,472, and exports \$8,266,060. No loans were raised during the year, and the public debt, which is fully secured on the revenue, is \$7,296,420, the major part of which was incurred on account of railway purchase and extension and the construction of canals. Altogether, Jamaica appears to be in a flourishing condition. Her trade with the United States comprises 50.9 per cent. of the total exports, and 37.2 of the total imports.

Nickel steel forgings for an experimental 8-inch breech-loading rifle have been finished, and the manufacture of the gun will begin at once at the naval gun factory in

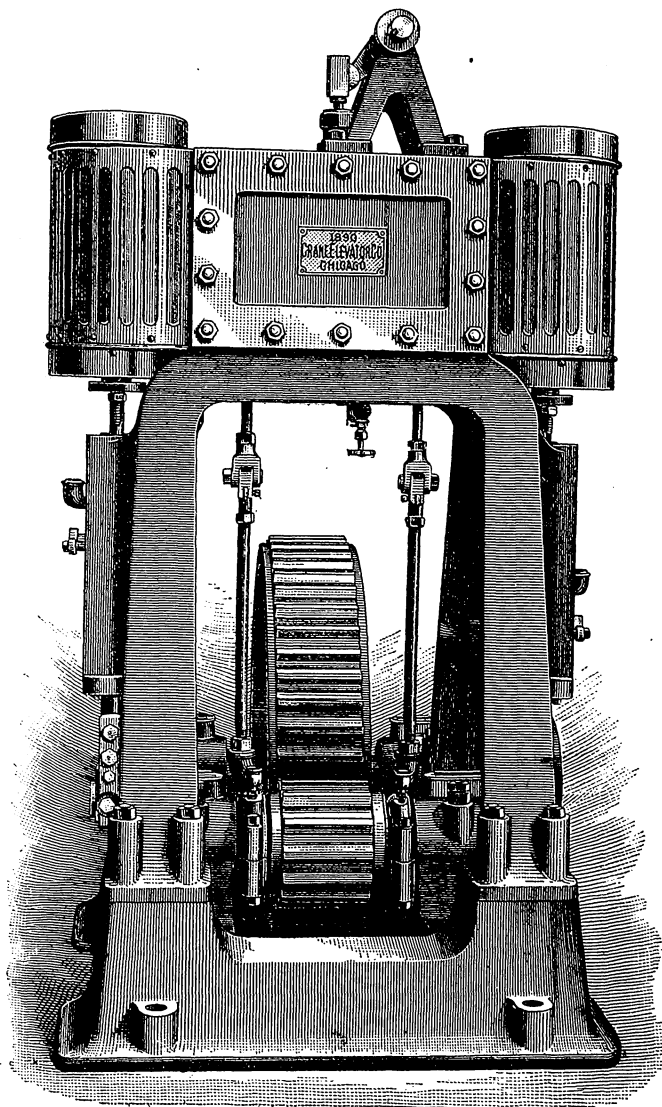


Fig. 2.

THE CRANE VERTICAL ENGINE.

feet from the ground. A peculiar characteristic of the Eucalyptus is that it grows very rapidly and yet has very hard and durable wood.

From the annual report of Sir Henry Blake, Governor of Jamaica, to the English Government on the state of trade in the Colony for the year 1891-92, we learn that the financial condition of the island was very satisfactory. Although the imports had fallen off to some extent, and the exports to the United States had decreased in value, owing to less demand in the orange and banana trade during the year, the island treasury shows a surplus of receipts over expenditure amounting to nearly \$1,000,000. The total imports in

Washington. Nickel steel has never been used in the manufacture of guns, and it is thought that the physical characteristics, such as increased elasticity and extraordinary elongation, render it specially adapted for guns subjected to high pressures with nitro powders. The forgings for this particular gun have 3.15 per cent. of nickel. The gun will be 304 1/2 inches long and will weigh 31,300 pounds.

The Cunard Steamship Company presented checks to the engineers and officers of the "Umbria" for their skill in mending her broken shaft at sea and bringing her into port last December. The subscriptions of the underwriters for the same purpose amounted to \$6000.

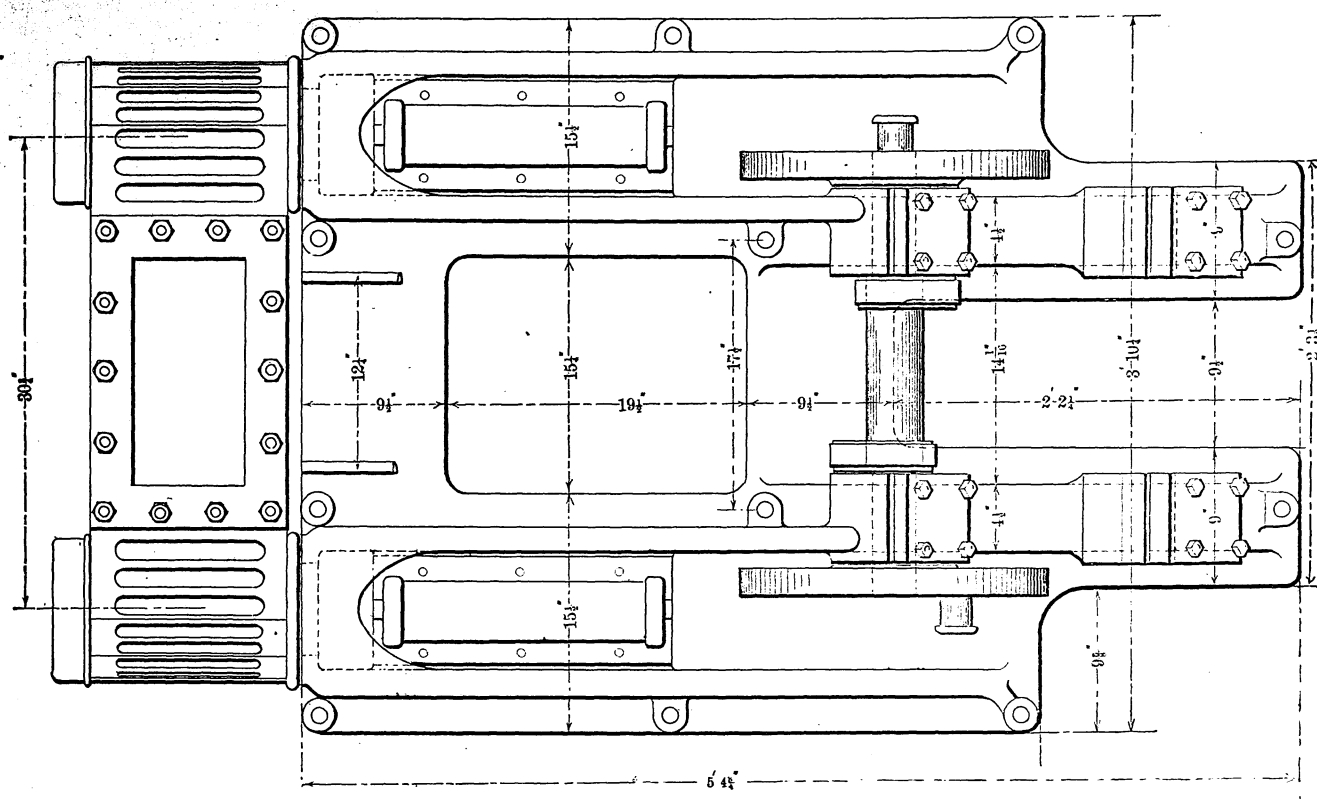


Fig. 3.—Plan View of Horizontal Engine.

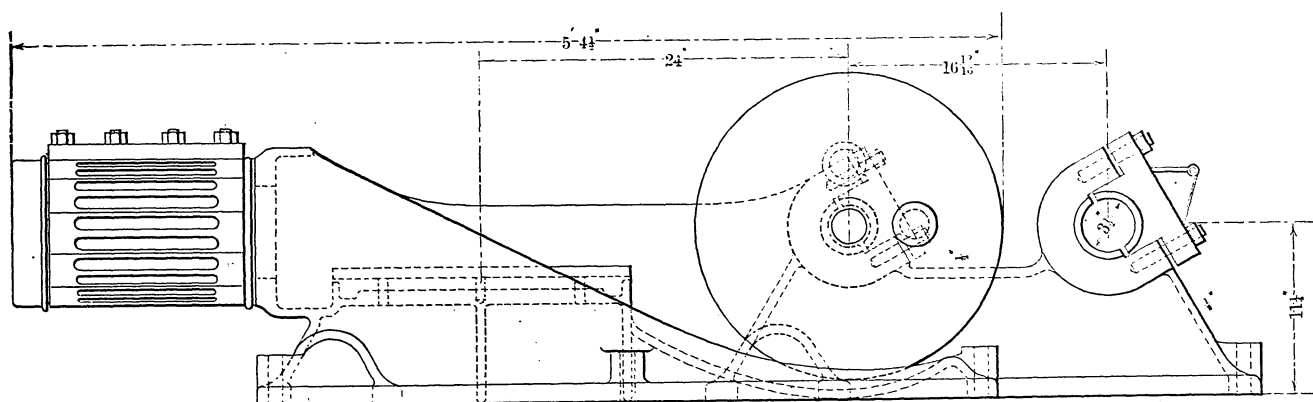


Fig. 4.—Side Elevation Horizontal Engine.

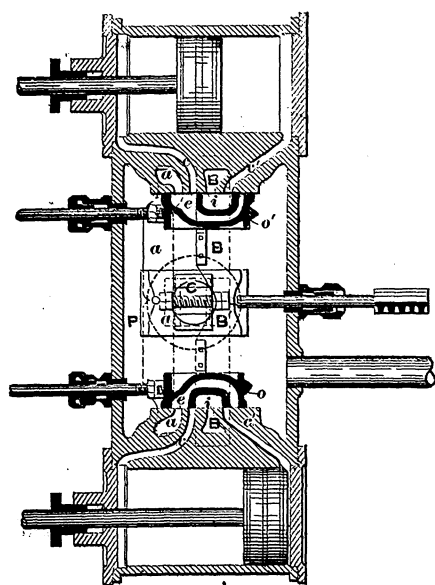


Fig. 5.—Horizontal Section on Line of Cylinder Axes.

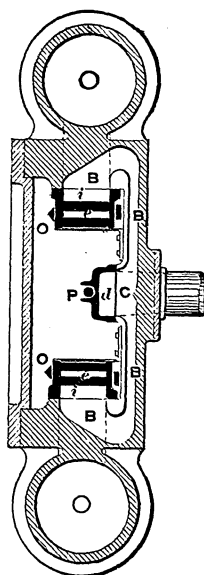


Fig. 6.—Vertical Transverse Section through Center of Port C.

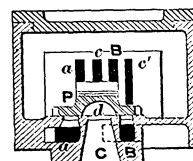


Fig. 7.—Vertical Section through Center of Reversing Valve.

WORLD'S FAIR NOTES.

Railroads Giving Bad Service.

With the opening day of the Fair less than a month distant every effort is being made by the officials to complete the work of preparation. The most serious delay now is caused by the unreasonable time taken by the railroads in delivering freight. The material for a large number of exhibits is kept by the railroads from ten days to two weeks when the distance hauled is only a few hundred miles. Even after the cars reach Chicago it generally takes four or five days to get them switched around. The Belt line, apparently, makes no effort to expedite the World's Fair cars. They lie on the side tracks for days, while exhibitors fume and fret at the chiefs of departments and the secretary of installation. Frequently exhibitors have brought a force of workmen from their home shops and the delay incurs a heavy loss to them, besides putting off the work that long. An aggravated instance of this kind last week came up in the installation office. The missing cars were traced finally to a side-track at Grand Crossing, less than two miles away, where they had lain a week without an effort having been made to get them to Jackson Park.

The material for the aquarium of the Pennsylvania Fish Commission has been over two weeks on the road. The officials are in Chicago waiting for the cars to arrive, but nothing can be heard from them. Cars over the Milwaukee & St. Paul have been two full weeks in reaching the park over the Belt line.

Although 200 cars a day are now being delivered at the fair the Transportation Department has had no trouble in handling the stuff as fast as it arrives, and the work is kept close up. The entire blame for the delays rests on the railroads, which handle exhibits the same as they would haul coal, and without the slightest apparent effort to get out of the rut. If the cars get side-tracked there they remain until the exhibitors fill the offices with complaints.

Exposition Roofs All Repaired.

Rain now has no terrors for the World's Fair chiefs or the exhibitors, for the roofs are at last water-tight. The great task, which was ordered by Chief of Construction Burnham before leaving for New York a week ago, was practically completed last Wednesday. A regiment of workmen had been employed. On the day previous there were 800 in the roof force, and 400 of them freckled the vast expanse of the Manufactures Building. There are still some repairs to be made, but they are more to preserve the roofs than to stop leaks.

The cost of repairing the roofs is estimated at about \$100,000. This figure is given by a contractor's superintendent, who has much to do with the repairs. A portion of this sum was due to the snow-slides on the Manufactures Building and Machinery Hall, but by far the larger part is chargeable to poor material and poor workmanship. The material for some of the roofs did not cost over 50 per cent. of what it ought. The contractors, however, were not altogether at fault. Canvas roofing was something new to most of them, and, as the roofs were only to last until the close of the fair, they naturally selected light material. The winter was against them, and a heavy loss has resulted. A considerable portion of the roofing was done with corrugated iron or steel, and even this was not as well laid as it should have been, but had to be repaired.

All the repair work has been charged against the contractors, but where they have been paid in full the exposition may have difficulty in collecting from their

bondsmen. The contracts provided only that the roofs be water-tight, and did not specify the material. Some of the contractors say they will not stand the cost of repairs made by the direct order of the exposition and will fight the case in the courts.

Instead of waiting for rain the repaired roofs have been tested by water from a hose, and have not been left until they were shown to be water-tight by resisting a downpour of rain.

Michigan's Exhibits.

In more ways than one the State of Michigan proposes to make itself known at the fair. Besides a building costing \$50,000 it will have the only logging camp on the grounds, an exceptionally fine mineral exhibit, a grand horticultural show, and other conspicuous objects of interest. The State has been going along without saying much, but constantly making preparations for patronizing and supporting the exposition on a large scale. The Michigan board is the only State organization that has as yet opened an office on the grounds.

"In the Mineral Department, Mines Building," said Secretary Smith, "is where we expect to scoop the world. I have no hesitancy in predicting that when the doors are opened Michigan's exhibit there will attract as much attention and admiration as any other State or any other country on the globe."

The exhibit will be displayed in a pavilion made of stone, iron, ore, copper, crystallized salt, silver, gold, granite, marble, verde antique and other specimens of minerals taken from the quarries and mines of Michigan.

One of the unique attractions inside this pavilion will be a biblical representation of Lot's wife turned to a pillar of salt. There will also be a specimen of copper ore as it comes out of the mine, 98 per cent. pure and weighing 10,000 pounds. The cost of this pavilion is estimated at \$20,000. It will stand in the center of the building opposite Germany and England, and is being constructed under the supervision of Peter White, member of the board for Marquette, and Jay A. Hubbell of Houghton.

The State has an outdoor space just south of Machinery Hall, where is being constructed a genuine logging camp 70 feet long and 20 feet wide. It will be an exact reproduction of the camps Michigan lumbermen live in, and the daily bill of fare, corn bread, pork and beans, strong black coffee, &c., will be the same as they have in the woods. Besides the camp there will be in this show the largest load of logs ever put on a sleigh and drawn by a single span of horses. These logs were cut and sent by Nester Bros. of Baraga, on the Sturgeon River. The load consisted of 50 pine logs, each 18 feet in length, piled in ten layers, varying in the number of logs from eight in the second layer to one capping the load. The biggest log contained 1225 feet, board measure, and the smallest 404 feet, and the whole weighed 300,000 pounds, or 150 tons. The logs were just cut, and were consequently heavy with sap and frost. They were loaded by means of chains and a pair of horses, with the assistance of three men. It took 1 ton of chain to bind the load together. The top of the last log was 33½ feet above the bottom of the runners of the sleigh. The horses weighed but 1700 pounds each and they pulled the load 80 rods on a level road to the rollway. The sleigh and team will be taken to the fair and the logs loaded again just as they were. It took ten standard size flat cars to transport the load to Chicago. The sleighs had 9 foot runners and 14-foot "bunks." That is, the width of the load was 14 feet. Near the camp will be a log train of five cars, and all about the place specimens of the

tools used by lumbermen from the opening of the first camp in Michigan down to the present time.

Besides these State exhibits Michigan will be represented by about 1000 of its citizens with individual exhibits of manufactured goods and novelties, the products of their toil and genius.

From the Bay State.

Six carloads of the Massachusetts State exhibit are now in Chicago. There is included in this shipment the entire mineral section of that State's exhibit and much of the old-fashioned furniture with which the Massachusetts headquarters will be furnished.

Commissioner Hovey, who is at the head of the Bay State Commission, says Massachusetts' exhibit in the agricultural department will be especially fine and will embrace many interesting features. Most prominent in this section will be the displays from the State agricultural training schools and experimental farms. Especially noticeable will be the educational section of the Massachusetts exhibit. Harvard University will make a magnificent display in this connection. The Massachusetts headquarters are now nearly completed. The building is a reproduction of the historic Hancock mansion and is among the finest of the State buildings.

Germany is Easily in the Lead.

Chicago papers say that it is at last possible to foretell where the honors of the exposition will go among the nations of the earth. Germany will be entitled to the first place among foreign exhibitors. The young Emperor's enthusiasm, spreading to his subjects, has produced the most magnificent exhibition of resources any nation has made outside of its own boundary lines. The beautiful structure, bearing the words "German Empire," has never been excelled as a national offering in a foreign land. It has been only since that structure neared completion that its beauty and imperial magnificence have come to be appreciated on the grounds. No one doubts that it is in Jackson Park to stay, for once the people of Chicago have seen it and roamed through its halls, public sentiment will not permit its destruction.

Mythology and metallurgy are a queer combination, but the pavilion now rapidly approaching completion in the Mines Building, which is to contain the exhibit of the great German iron works operated by the Barons Strumm, embraces in its details both of those sciences.

German mythology is illustrated by the devices with which the pavilion is decorated, and metallurgy is illustrated in every feature of the exhibit. The Strumm Brothers operate a plant that requires the employment of 5000 men. They are among the most advanced of the world's great iron manufacturers, and their display fully typifies the wonders that may be worked out of that base metal.

This structure will be 46 feet high and will occupy a floor space of 37 x 108 feet. The rear walls are of masonry, but the front elevation will be composed of heavy iron and steel manufactures of every conceivable device. Various German legends are being worked out in the design, merchant shapes forming the decorative material. A great portal in the center will give access to the pavilion. Over the entrance will be this inscription: "Vereinigte Eisenwerke Gebrüder Strumm, Nuenkirchen und Rudolph Boecking, Hallberger Huetten." This will be worked out in mosaics with cinder and slag. Over this device will be the word "Strumm," also fashioned in the same manner. Iron and steel beams of different shapes will form the side columns of the portal, and surmounting the lettering will stand, upon a scroll of intricate design, a life-sized mythological figure of hammered copper.

The scroll is made of manufactured iron pipes such as are turned out by the car-load every day at the Strumm works.

At each of the four corners of the exhibit will be placed a large obelisk formed of T rails, round, angle and flat bars and various other products of the Strumm Mills grouped in artistic designs. These pyramids are 50 feet high. The two nearest the entrance are composed of transverse sections of beam iron. The trophies in the rear are of the same height as those of the front elevation. The one on the right is composed of pipe iron, while that on the left is formed of band and strap iron, having the form of a gigantic flower stock, and fastened together at the base by hoops and coils of wire of various circumferences.

The rear of the pavilion is formed of solid masonry, and the front will be inclosed with a post and chain railing. The posts are samples of the results that may be obtained in iron and steel decorations. The head of each post consists of some familiar mythological god or goddess wrought in iron and steel, while the foundations are composed of manufactured articles of the same material.

The rear wall will be covered with photographs of the mammoth works of the Strumms, and there will be displayed the history of the concern since it was founded. The art of iron working has been brought to its highest development by this firm and their entire display is calculated to illustrate the achievements accomplished in that branch of industry in the past decade.

One of the most interesting parts of the exhibit is the immense iron rail which will form a portion of the frieze in the rear of the pavilion. This rail is 200 feet long and is bent in the form of a scroll, having been bent cold.

All along the front of the exhibit excellent paintings in oil are hung representing the various buildings and departments of the works. The visitor will also find there statistical references, such as the number of workmen employed in each division, the annual production, and the benevolent institutions for disabled and sick employees and their families, &c. Solid obelisks, 30 feet high, connected by scrolls of solid steel and cast iron, surround the interior of the mammoth exhibit.

Herr Mayer, who superintends the construction of the pavilion, is a young man who has secured a position of responsibility in the great establishment. He is a graduate of the Saarbruecken Gymnasium. He served a year in the Garde-Fuesilier Regiment. He also completed a course in the Royal Technical School of Saarbruecken.

From New South Wales.

One of the most interesting displays that will be seen within the great structure devoted to mines and mining will be that now being prepared by the representatives of New South Wales. The work of installation is being superintended by J. E. Carne, F. G. S., of the Department of Mines, of Sydney. Speaking of the display yesterday, Mr. Carne said:

"It will undoubtedly surprise the American public to learn that in point of value gold does not rank first among the minerals of New South Wales. Coal will be made a feature of this exhibit, and it deserves the honor, because it is our most valuable mineral. The order of the output of the minerals of the colony is coal, gold, tin and copper.

"As a whole this exhibit may be said to be a heroic display of base metals. Along the front line will be massive trophies of silver ore, tin, copper and antimony. One particularly interesting feature will be the silver monument, which is to be erected at the northeast corner of the exhibit space.

It will represent one-sixth of the entire output of the great Broken Hill Mine, which from May, 1886, to May, 1892, produced 36,500,000 ounces of silver and 156,000 tons of lead.

"In the rear there will be a triple arch, with two center pillars of coal and two outer pillars of petroleum oil coal, which is locally known as kerosene shale. These pillars will be 4 feet square and 11 feet high. Behind this feature will be shown full sections of principal coal scenes.

"That portion of the display which will be first seen by the visitors will be made up of bulk trophies of gold, silver, copper, tin, antimony, iron, manganese and chrome and building stone. These will be made as attractive as possible. Then there will be show cases containing collections of all metallic and non metallic minerals. In these collections will be some of the most valuable specimens ever discovered. Quartz and placer gold and gems will be displayed as a distinct feature. And then there will be collections of fossils from the principal sedimentary formation. These will be accompanied by geological maps that will give one a comprehensive understanding of the physical formation of the colony."

The Great Waterbury Clock.

A few days ago the story was cabled to America that England would set up within the Manufactures Building a clock that would tell the time o' day in more ways than any other clock ever constructed. But when the makers come to install that feature they will find, anomalous as it may seem, that they are way behind the times. In the center of the big building will be displayed a mammoth clock that will chime the time for all, built by the Waterbury Clock Company, that in the diversity of its accomplishments will be to the English clock as an hour is to a minute.

It was the original intention of the Waterbury Company to complete its clock so that it might be placed on exhibition at the Paris Exposition in 1889, but the scope of the undertaking assumed greater proportions as the work progressed, and it has been completed only a few weeks.

The timepiece stands 16 feet in height, with a 6 foot base. It is made of black walnut, highly polished and handsomely carved with scenes representing American history from the landing of Columbus to the present time. At the lower part of the clock and on each side is an allegorical scene representing mechanical progress during the last century, every figure in each group being in motion.

The largest scene is in the center of the clock. It represents the "train room" of the Waterbury Clock Company, with all the shafting and machinery in operation and 25 operatives at work. The figures go through every motion of work in that department.

Four scenes are represented on the sides of the clock. The subjects are, first, a cotton gin in full operation in a cotton field, with the negroes carrying the cotton in from the fields and placing it on the cotton gin, while Eli Whitney, who stands by, is explaining the working of the machinery to a planter. A second scene shows the old method of manufacturing cloth. The operatives are at work beating the flax and preparing it for the looms and spinning wheels. A third scene represents a coal mine with the cage working and the miners digging into the banks of coal.

In a fourth scene is a representation of the improvement in sewing machines. Elias Howe is watching the work of one of his machines, while close by modern machines are plying, and in another adjacent group are a number of women laboriously sewing by hand. The fifth group indicates the advance in the electrical world. Electrician Daft is represented

operating a dynamo. The sixth shows the interior of a telephone and telegraph office with operators at work and messenger boys running in and out.

Scene seven contrasts the old and new methods of manufacturing watches, showing the improved factories of the present day and a kitchen in Switzerland where watches were made by hand a century ago. The last is an old-fashioned saw-mill with the saw running, logs moving, and children playing near by.

The figures are all operated by an electric motor and are constantly in motion. The center of the clock is occupied by a beautiful water color of the buildings of the clock company, while just above is the handsome dial of the clock. It is 3 feet in diameter and indicates the days of the week, month, and year, the hours, minutes, and seconds of the day, and the moon's phases and tides. Each figure represented is an exact likeness, and the whole is complete in every respect. At the top of the clock is a handsome carving of the "Declaration of Independence" with a reproduction of the famous old Liberty bell.

Will Light Chicago Harbor.

During the exposition season seven miles of the Lake Michigan front will be lighted by means of electric buoys. This is to be a feature of the fair, and will form a part of the Government exhibit.

Capt. W. S. Schley, U. S. N., who is now in charge of the Third Light House District, the headquarters of which is at Tompkinsville, Staten Island, arrived in Chicago last week. He will have charge of the work of arranging the line of buoys, and will superintend the greatest electrical experiment ever undertaken in any country.

If Captain Schley is successful harbor navigation will be revolutionized. The current for the lights will be furnished from one station. A power station will be erected at one end of the line and one cable laid the entire distance they propose to light. The wire will be of very small caliber at the dynamo, and taper up to about an inch at the return end. It will be made in this manner to save any loss of the current by friction. It is proposed to send 1500 volts over the entire line from one station, and a sufficient current will be taken off by means of a converter to supply each individual light. Fourteen miles of cable have been received, and will be used to complete the return circuit. The cost of the experiment will be about \$25,000. To light the harbor by the old system would cost ten times that amount.

A Pavilion of Solid Mahogany.

One of the most magnificent and unique pavilions being constructed within the Manufactures Building is that which will house the exhibit of the Meriden Britannia Company. This pavilion is little more than 20 feet square, and yet will cost about \$40,000. It is being constructed of solid mahogany and plate glass. It fronts on Columbian avenue, opposite the pavilion being erected by Germany. If the exhibit is worthy of the pavilion it will certainly be the finest of its line in the department.

A new method of securing cheap electric light from refuse has been exploited in England. A company has been formed in London, under the name of the Refuse Disposal Company, with the object of handling the dust refuse of cities and utilizing it, through the medium of destructors of their own design for electric lighting purposes. It is claimed that 20,000 tons of house dust, treated according to their system, may be made to produce as much as 5,600,000 indicated horse-power.

The Westward Movement of the Center of Population.

In his speech at Pittsfield, Mass., Senator Dawes made pointed reference to the marvelous growth which the Western section of the United States has achieved since his entrance on public life. "The country," he said, "has been widening and going westward and westward to the Pacific Coast, and then on beyond, until the latitude itself fails to chronicle our onward march, and westward falls into the eastward, so that the sun will not go down to night upon our westward border until it shall have risen on the coast of Maine." The continuousness of this growth is shown by the steady westward movement of the center of population. When the census of 1850 was taken, two years after Mr. Dawes' public career began, the center of population was located at a point 23 miles southeast of Parkersburg, W. Va.

average, 48 miles of westing being made, which would be about 2 feet 11 inches per hour. We may add, to bring the estimate down to the beginning of 1893, that, if the rate of progress noted in the past census decade has been maintained in the two and one half years since the census was taken, the present center is found at a point 8 miles east of Columbus, Ind., about half way between that city and Waynesburg. And the census of 1890 will, at the same ratio, bring it to a point nearly 2 miles south of Unionville, Ind.

It is a curious fact that while the westward movement of the population has covered no less than $9\frac{1}{4}$ degrees of longitude (9 degrees 21 minutes 7 seconds), this movement has run almost in a straight line, the extreme northern and southern variations embracing less than one-third of a degree of latitude (18 minutes 56 seconds). To put the contrast more distinctly, we may say that while the western movement for the century aggregates 505 miles,

granite. The inventor is represented standing dressed in the regulation frock coat, with a drawing scroll in his left hand and draftman's compass in his right.

The Premier Steel Company.

The plant of the Premier Steel Company of Indianapolis now embraces the following: In the Bessemer department there are three cupolas* with a combined melting capacity of 500 tons of metal per day of 24 hours; two 6 ton converting vessels, eight soaking pits, each capable of holding four of the largest ingots; two blowing engines, manufactured by Mackintosh, Hemphill & Co.; one 32 inch two-high blooming mill, manufactured by the same parties, with 175 feet of table, and a powerful shear with a capacity of shearing 12 x 12 inches, or slabs 20 inches wide. The steam is furnished for

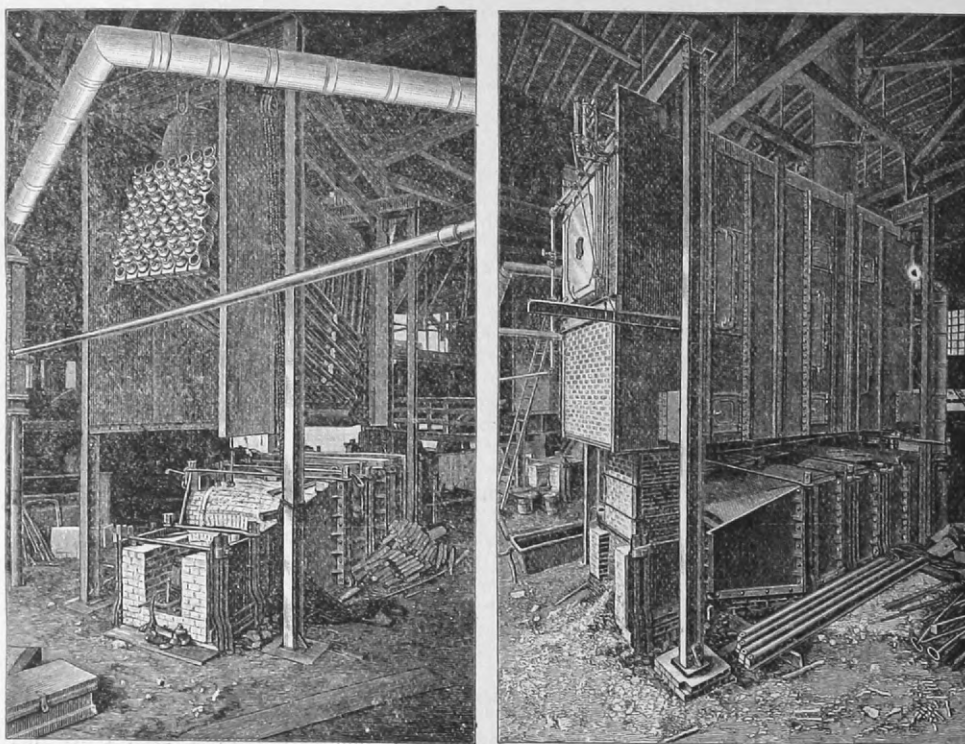


Fig. 1.—Babcock & Wilcox Boiler Over Puddling Furnace at Pennsylvania Bolt & Nut Company, Lebanon, Pa.

The census of 1890 puts the point 20 miles east of Columbus, Ind. Here is a westward movement of 229 miles in 40 years, giving an average rate of 5.72 miles per year.

If the measurement is carried 60 years further back, to the first census of 1790, we find that there has been in the 100 years a movement westward of 505 miles, the center of population having passed from a point 23 miles east of Baltimore, Md., to the location in Indiana noted above. The rate of progress for the whole period averages 5.05 miles a year, or 73 feet a day. In other words, for a century the center has been moving westward at an average rate of 1 yard an hour, with 1 foot thrown in every 24 hours for good measurement. The slowest progress was made in the second decade, from 1800 to 1810. In this period the population center achieved only 36 miles of westing, or at the rate of about 2 feet 2 inches per hour. The swiftest progress came in the seventh decade, from 1850 to 1860, when the center moved westward no less than 81 miles, or at the rate of about 4 feet 10 inches per hour. During the last decade of the census enumeration, from 1880 to 1890, the rate dropped a little below the

the extreme northern and southern variation is a little under 22 miles, and the finishing point of the line is only some 6 miles south of the starting point. The slowness of this variation may be taken as showing that if you divide the United States by the thirty ninth parallel of north latitude the growth of the population in the two sections thus made has been very nearly equal during the 100 years covered by the 11 censuses. In view of the fact that the tide of immigration from foreign countries has set mainly into the northern section, such an equality in the growth of the population is a development that would hardly have been looked for.

The bronze monument to be dedicated to the memory of John Ericsson of monitor fame will be unveiled at the Battery before the end of April. The statue is of standard bronze, 8 feet 3 inches high and weighs 1500 pounds. It was taken from a clay model by J. Scott Hartley. Frank E. Wallis is the architect of the pedestal, which will be 9 feet high, and made of Quincy granite, with polished panels 27 x 12 inches each. The lower part of the pedestal will be of rough, unpolished

this machinery by 12 tubular steam boilers, 175 horse power each. All this machinery is contained in a steel and iron building 350 feet long by 60 feet wide in the blooming mill department and 100 feet wide in the Bessemer department. Adjoining that building is the open-hearth department with two Siemens-Martin furnaces 15 tons each, equipped in the most modern style.

Adjoining the shear end of the blooming mill, and extending westward, is the architectural steel rolling mill—a brick structure, 400 x 300 feet. In this mill is a 26 inch three high train, driven by a Porter-Allen 2000 horse-power engine, with the necessary complement of boilers, pumps, &c. This mill was originally built for a rail mill, and all its equipments have been so preserved that it would need but a few days to go on to rails. On this train, at present, there are being rolled steel I-beams, channels, &c. This particular mill is also equipped to roll wide slabs up to 28 inches of any thickness. In the large mill formerly used for rolling iron rails and muck bar are now being placed one 18 inch and one 12-inch train, on which sheet bars, flats, rounds and squares of all sizes will be made.

The principal product of the works consists of billets, sheet bars, slabs and architectural steel of all kinds. The plant has a well-equipped machine shop and foundry, making all its own rolls, molds, &c. The company own about 20 acres, and have their own railroad, connecting it with the union tracks, so that they have no switching charges whatever. The principal trade for the product of the mill is in the West and Northwest. The officers of the company are: C. W. DePauw, president; N. T. DePauw, vice-president; Albert

Babcock & Wilcox Boilers Over Puddling and Heating Furnaces.

Rolling-mill managers have long appreciated the serious drawbacks incident to the use of two-flue and cylinder boilers as a means of at least partially utilizing the waste heat of puddling and heating furnaces. The intense and fluctuating heats of the furnace, particularly in the case of the puddling furnace, have a very serious

McCullough Iron Company have placed orders for these boilers, aggregating 1200 or 1500 horse-power, with the Babcock & Wilcox Company, and have found that the boilers universally give satisfaction.

The Catasauqua Mfg. Company began using this boiler for puddling furnaces in 1881. In 1882 the American Sheet Iron Works and the Delaware Rolling Mill of Phillipsburg, N. J., put some of these boilers in for the same purpose. The latter part of the same year the McDaniell & Harvey Company of Phila-

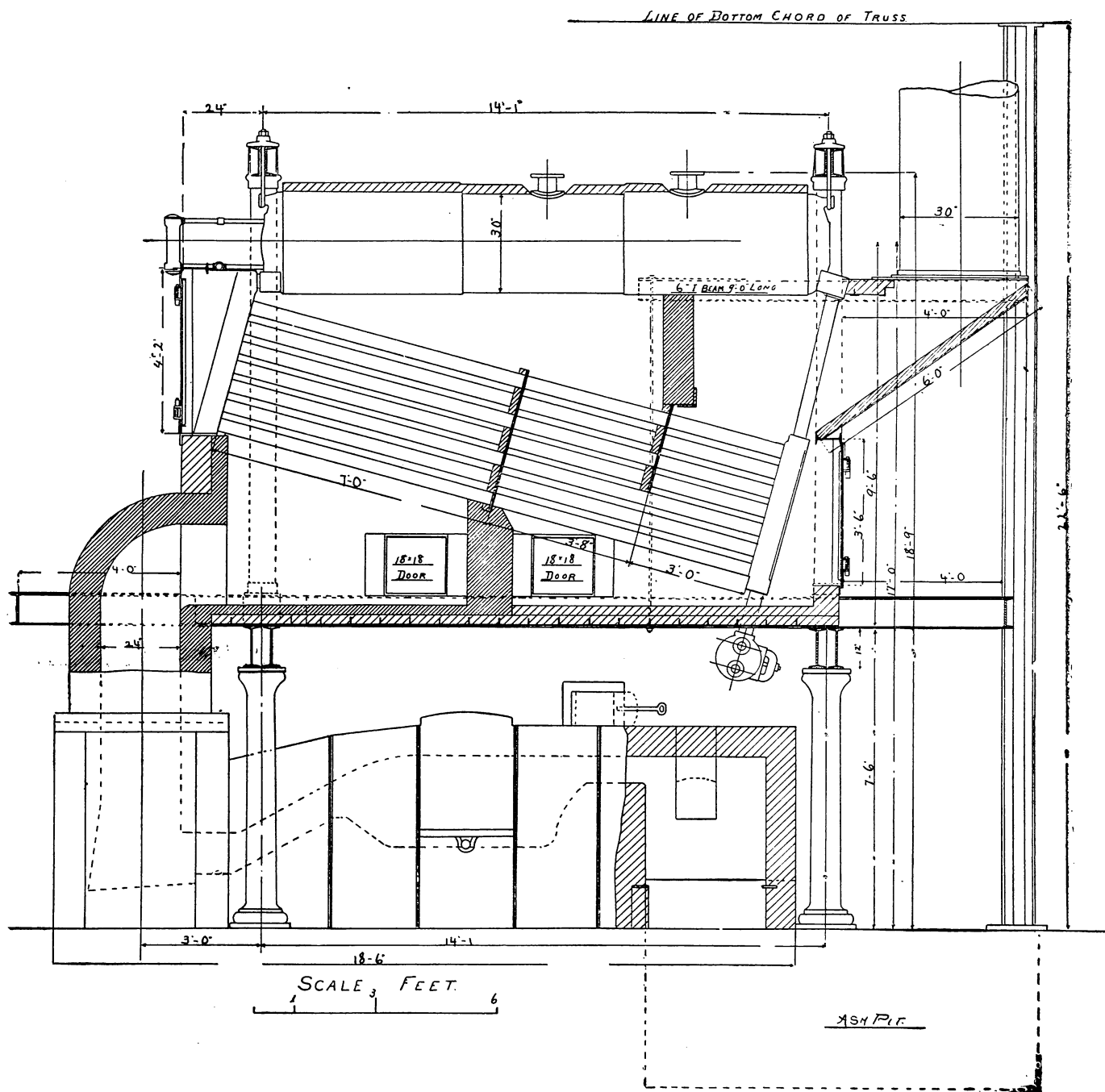


Fig. 2.—Longitudinal Section Babcock & Wilcox Boiler Over Puddling Furnace.—Oliver Iron & Steel Company, Pittsburgh.

Trinler, treasurer, and W. H. Coen, secretary and general manager.

A decision is pending in the United States Supreme Court in the infringement case of the Union Switch & Signal Company of Pittsburgh against the Johnson Railroad Signal Company of New Jersey. Last week arguments were made in the case, and a decision is expected at an early date. The matter came up from the New Jersey Court, where the bill of complaint of the Union Switch & Signal Company for an alleged infringement by the Johnson Company on patented improvements on railroad signals was sustained.

influence upon the life of the boilers, leading generally to heavy repairs, and occasionally to disastrous explosions. To some extent also the addition of boilers to the furnace plant influence adversely the operations conducted in the furnace itself. This suggested, even in the early development of the water-tube boiler, its employment for this purpose. The first attempt to use them was made by the McCullough Iron Works of Wilmington, Del., who, in 1874, put some Babcock & Wilcox boilers over puddling furnaces in their Wilmington mills. These boilers, erected 17 years ago, have been in constant use ever since, have given entire satisfaction, and have required practically no repairs. Since 1874 the

delphia adopted them. In 1885 the Troy Iron & Steel Company of Troy, N. Y., put some of them in on trial, and have added from time to time since then until they have now nearly 2000 horse-power of these boilers utilizing waste heat at their works.

The design developed in the experience gathered in the use of the Babcock & Wilcox boiler is shown in the accompanying engravings, Fig. 1 illustrating the appliance as put in at the works of the Pennsylvania Bolt & Nut Company, Lebanon, Pa., where the method of suspending the boiler from four upright columns is very clearly shown. Fig. 2 is a longitudinal section of the Babcock & Wilcox boiler, as put in at the Oliver Iron & Steel Company, Pitts-

burgh, Pa. There are two of these boilers, each one entirely separate and distinct from the other, each boiler having its own

tubes, 14 feet long, these connected with the steam and water drum overhead, front and rear, by 4 inch wrought iron tubes.

boiler is suspended a mud drum 12 inches in diameter the full length of the width of each boiler. Each section of the tubes has a separate nipple connecting it with the mud drum direct. All the tube joints are expanded with a Dudgeon expander into finished tapered holes, and, the pressure being from the inside, the higher the pressure the tighter the joints will be. The pressure parts of the boiler being erected, the side and end walls are built up around them, the stack is placed upon its support, the cleaning doors and fittings, all of standard design and weight, are placed in position, and the boiler stands ready for firing. Boilers for this purpose are built to stand a working pressure of 150 pounds to the square inch and range from 90 to 416 horse-power, depending upon the size of the puddling or heat-

stack, the battery spanning two puddling furnaces.

The construction of the boiler and setting is as follows:

Four cast-iron columns are erected on brick or stone piers at the sides of the puddling furnaces, spaced so as not to interfere with the working of the furnace. Two pairs of 12-inch I-beams are thrown across and clear of the furnaces, each pair resting upon two of the columns. Upon these 12 inch beams six 9 inch I-beams are laid lengthwise of the furnace. These support the side and end walls of the brick setting, and by their bottom flanges support $2\frac{1}{2} \times 2\frac{1}{2}$ inch T's laid between and

ing furnaces to which they are to be attached. The drums are made of $\frac{5}{8}$ -inch open-hearth flange steel. It will be noticed by referring to Fig. 2 that the front part of the boiler is at the rear part of the puddling furnace. This makes the front part of the puddling furnace the coolest part of the boiler, as the gases are ready to be discharged into the stack on reaching that part of the setting around which the puddlers work. This is a great advantage, as with the two flue boilers the heat given off by the boiler has been such as to seriously inconvenience the puddlers at their work.

Ample facilities for keeping the exterior of the tubes free from dust and dirt are

at right angles to them, the T's being one brick's length apart and affording support for a fire-brick floor laid between and over them.

This type of boiler is suspended from an iron frame work and does not depend upon the brick work in any way for its support. To this end there are erected four vertical I-beams, two front and two rear, resting upon the longitudinal 9-inch beams directly over the ends of the transverse 12 inch beams. Across these vertical beams rest two pairs of channels, each pair secured at both ends by cast-iron boxes. From these channels are suspended two 30-inch steam and water drums, 14

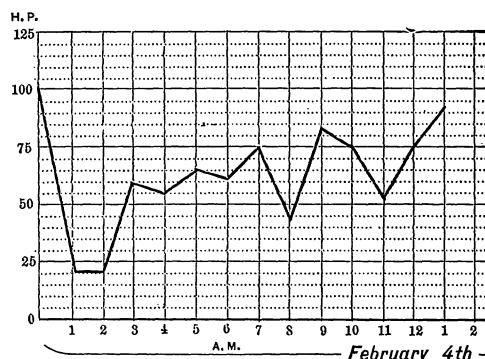
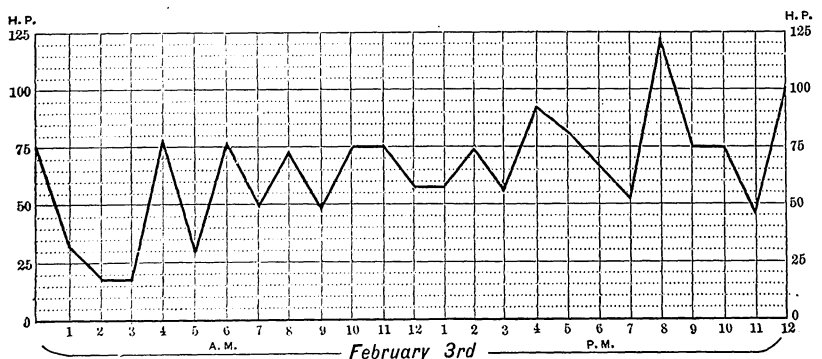
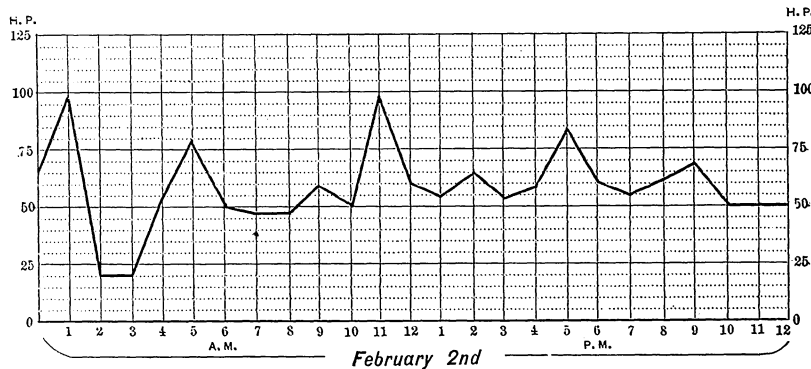
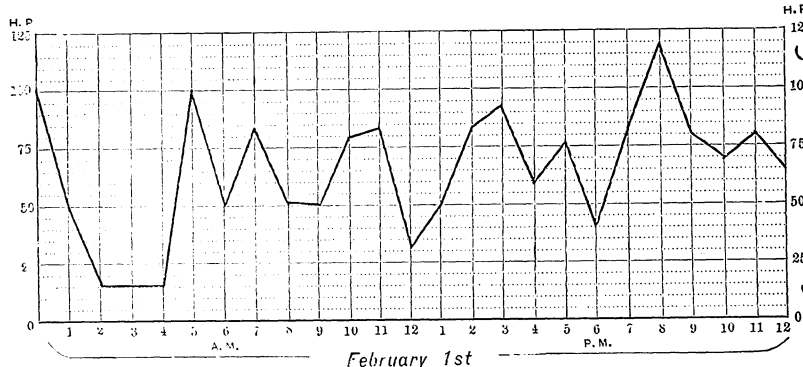
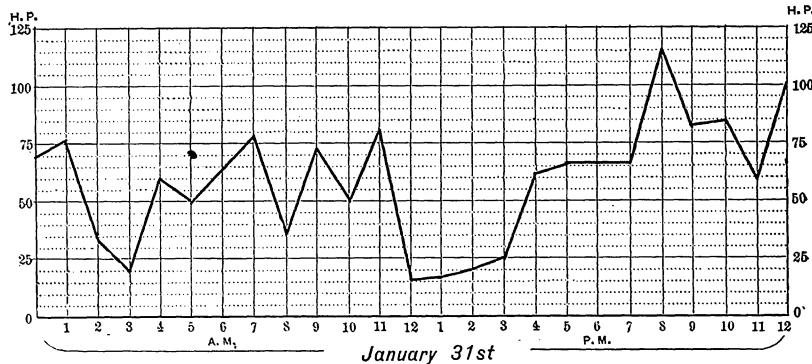
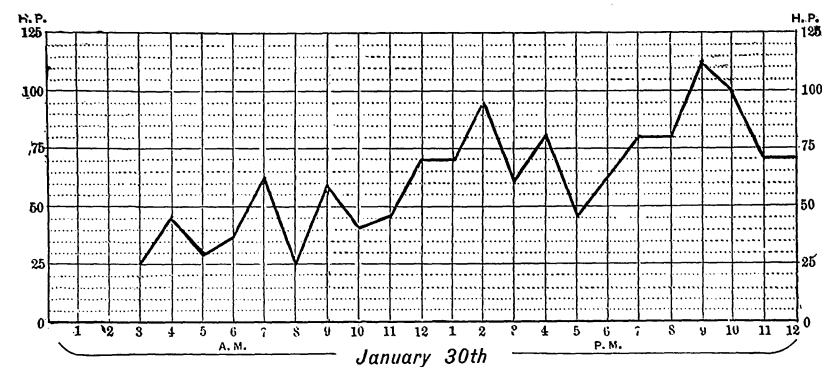


Fig. 4 to 9.—Hourly Fluctuations in Horse-Power of Babcock & Wilcox Boilers Over Puddling Furnace at the Pennsylvania Bolt & Nut Company, Lebanon, Pa.

feet long. From each of these steam and water drums are suspended four sections, each containing seven 4-inch wrought-iron

All the tubes and nipples are made of the best charcoal iron. From the bottom of the rear ends of these sections in each

provided by large cleaning doors let into the side walls of the boiler, through which the steam jet is introduced, and the ac-

accumulations removed by its use are taken out periodically through other cleaning doors placed in the side walls near the floor. The same easy means of access to the interior of both tubes and drums are provided as are found in the ordinary type of this boiler, and platforms, 4 feet

eter and 18 feet long, 6 sections wide and 9 tubes high, drums 36 inches diameter and 18 feet 6 inches long; and one cylinder boiler 42 inches diameter and 26 feet long. Both boilers supplied by the waste gases from puddle furnaces. The coal burned on the puddle grate under the

of the coal consumption, water evaporated and iron puddled, it was decided to make a test for one week, which was the period that the puddle furnace was in continuous use.

"The operation of heating the furnace was commenced at 12.05 a.m., January 30, 1893, and at 3 a.m. the steam pressure in the boiler had reached 60 pounds, and the boiler was cut into the main steam line, the height of the water in the glass being noted at the same time. At 4 a.m. the furnace was considered hot enough to take the average charge of 1150 pounds of pig iron.

"Scales which had been previously standardized were used to weigh both water and coal. A tank that would hold 1500 pounds net of water was operated on one scale, and the time that its contents were pumped into the boiler was carefully noted, the height of water in the glass being kept at nearly a constant level. This afterward proved useful, as it enabled the horse-power to be ascertained at every hour during the run, thus forming a chart showing its fluctuations, due to the great range of temperature to which the puddle furnace is subjected.

"Samples of coal were weighed out from time to time in order to obtain the amount of moisture contained, which was found to average 6.7 per cent. This high

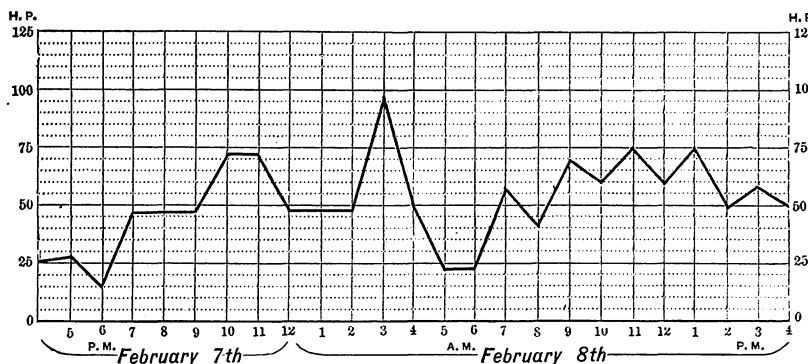


Fig. 10.—Fluctuations of Horse-Power of Cylinder Boiler Over Puddling Furnace.

wide, front and rear, give ample standing room for men engaged in cleaning, inspection or repairs.

The following table presents a summary of a series of tests made at different times at the different mills enumerated:

B. & W. boiler included that used in heating the furnace and banking fires.

We quote as follows the report of Wm. D. Hoxie on the test made:

"When looking over the results of a test of a boiler situated over a puddle fur-

Summary of Tests Made Upon Boilers Generating Steam by Means of Waste Gases From Puddle and Heating Furnaces.

No.	Description of Test	Conductor of Test.	
		No.	Name
No. 1.	One B. & W. boiler over a puddling furnace.	D.	Ashworth.
No. 2.	One B. & W. boiler over a scrapping furnace.	Geo. A.	Rowell.
No. 3.	One B. & W. boiler over a puddling furnace.	Geo. A.	Rowell.
No. 4.	One B. & W. boiler over a puddling furnace, 1.34 pounds of iron puddled per pound of coal.	D.	Ashworth.
No. 5.	One B. & W. boiler over a puddling furnace, 1.38 pounds of iron puddled per pound of coal.	W. D.	Hoxie.
No. 6.	One cylinder boiler, 42 inches diameter, 26 feet long, over puddling furnace, 1.14 pounds of iron puddled per pound of coal.	W. D.	Hoxie.
No. 7.	One B. & W. boiler over a heating furnace.	W. D.	Hoxie.

Data of Test.	Oliver Iron & Steel Company, Pittsburgh.	Union Rolling Mill, Cleve- land.	W. D. Wood & Co., Pittsburgh.	Pennsylvania Bolt & Nut Company, Lebanon, Pa.			
	Test No. 1. Oct. 23, 1891.	Test No. 2. April 18, 1892.	Test No. 3. April 19, 1892.	Test No. 4. Oct. 4, 1892.	Test No. 5. Jan. 31-Feb. 5, 1893.	Test No. 6. Feb. 7-Feb. 8, 1893.	Test No. 7. Feb. 9, 1893.
Heating surface per horse-power, square feet	9.2	10.7	10	11.2	19.11	2.72	15.58
Grate surface per horse-power, square feet	0.17			0.21	9.217	0.258	0.18
Coal burned per horse-power, pounds	5.4			5.1	5.53	9.16	4.7
Heating surface, square feet	1,026	841	513	513	1,196	143	1,380
Grate surface, square feet	19.83			9.7	13.6	13.6	162
Ratio of heating to grate surface, square feet	52			52.8	87.2	10.5	82.8
Kind of fuel used	Bitu. Slack	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous	Bituminous
Duration of test, hours	8	2	3½	8	130	24	12
Average steam pressure, pounds	102	68	69.3	123	58.2	63	57.4
Average temperature of feed water entering boiler, degrees	150	52	53	143	124.5	123.6	142
Pounds of coal burned	48.69			1,865	45,007	11,551	4,993
Pounds of refuse					6,038	1,464	598
Pounds of combustible					38,969	10,087	4,395
Per cent. of ash					11	12.6	12
Coal burned per square foot grate per hour, pounds	30.7			24.3	25.45	35.38	24.96
Total water evaporated at temperature of feed, pounds	26,564	4,493	4,930	11,250	250,503	38,739	33,265
Water evaporated per hour, pounds	3,358	2,342	1,772	1,406.2	2,159.3	1,812.6	3,054.8
Water evaporated per square foot heating surface per hour, pounds	3.27	3.2	3.45	2.74	1.8	12.67	2.21
Water evaporated per pound coal—actual conditions, pounds	5.6			6.3	5.565	3.35	6.66
Water evaporated per pound coal, from and at 212° pounds	5.9			6.75	6.236	3.76	7.341
Water evaporated per pound combustible—actual conditions, pounds					6.428	3.84	7.568
Water evaporated per pound combustible, from and at 212° pounds					7.303	4.31	8.339
Quality of steam by Heisler calorimeter, per cent.					1.95	2.23	2.4
Rated horse-power	90	73	50	45	104		120
Horse-power developed (horse-power equals 30 pounds water evaporated per hour from feed at 100° and 70 pounds pressure)	111.3	78	51.4	45.64	62.58 For 120 hours	52.54	88.54
Per cent. above rated capacity	24	6.9	2.76	1.4	67.80		0.74 of cap.
Temperature of boiler room, degrees					57	50	52
Temperature of flue gases, degrees	493	600	600		525	1,000-2500	400
Force of draft in inches of water	0.3			0.15	0.31	In ash pit, 75	In ash pit, 8.

Particular interest attached to the tests Nos. 5 and 6, made at the Pennsylvania Bolt & Nut Company, to show the relative efficiency of a Babcock & Wilcox boiler and of a cylinder boiler at the same mill.

One Babcock & Wilcox water-tube boiler, containing 54 tubes 4 inches diam-

nance the reader should bear in mind the fact that the boiler is operated by waste gases, the coal being burned in order to puddle the iron, the boiler taking up that amount of heat in the waste gases that would, without its intervention, escape up the stack.

"In order to obtain a complete record

figure was accounted for by the coal being exposed to heavy rain and snow storms.

"The coal consisted of a mixture containing about 75 per cent. of Cross Creek, the remaining 25 per cent. being made up of Beech Creek and Pennsylvania Clear-field.

"Observations every half hour were

taken of the thermometer and manometer of the Heisler calorimeter, the average results of which are here appended:

January 30, 1893. Per cent. of moisture in steam.....	1.8
January 31, 1893. Per cent. of moisture in steam.....	2.12
February 1, 1893. Per cent. of moisture in steam.....	1.9
February 2, 1893. Per cent. of moisture in steam.....	1.95
February 3, 1893. Per cent. of moisture in steam.....	1.75
February 4, 1893. Per cent. of moisture in steam.....	2.15
Average for run.....	1.95

used, including that used in heating the furnace and banking the fires, the latter of which was done for a period of from one to three hours, during the shifts of the day and night turns. This occurred between 12 and 4 a.m. each day and its effect is shown by the continuous depression of the curve corresponding to that time of day on the horse-power chart.

"The quality of the coal was the same in both tests.

"The total number of pounds of finished iron produced from the furnace under the B. & W. boiler during the

is far in excess of what the heating surface could absorb, which is shown by the temperature of the escaping flue gases, ranging from 1000° to 2500°.

"The economy of the two boilers is illustrated by a comparison of the pounds of coal required to produce a horse-power. In the B. & W. boiler this amounted to 5.53 pounds, while 9.16 pounds were necessary in the cylinder boiler.

"Deducting ten hours for banking fires, during which time the B & W. boiler was practically at rest, we have 67.8 horse-power as an average for the remaining 120

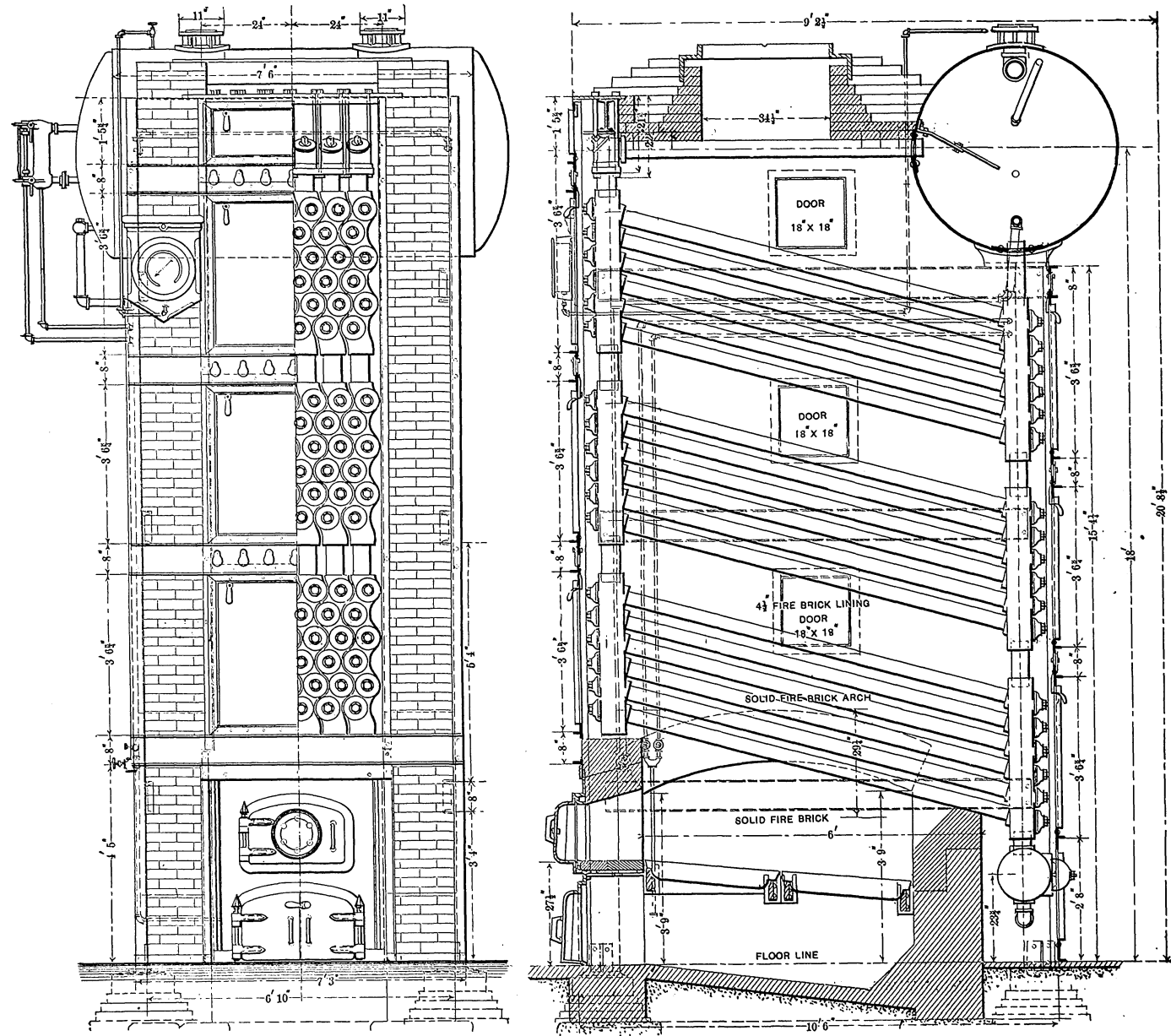


Fig. 11.—Triple-Deck Babcock & Wilcox Boiler, Utilizing Heat from Scrap Furnace and Billet Furnace.—N. E. Ayer & Co.'s Rolling Mill, Portland, Oregon.

"As a means of comparison it was decided to run a test of 24 hours' duration upon a plain cylinder boiler, similarly placed and also operated by waste gases. In this case, as in the other, the moisture in the coal was carefully measured, and, as in the former test, the Heisler calorimeter was used to obtain the moisture contained in the steam, the results of two series of observations taken as before being:

February 7, 1893. Per cent. of moisture in steam.....	2.32
February 8, 1893. Per cent. of moisture in steam.....	2.15
Average per run.....	2.23

"The dry coal burned on the grate of the furnace under the B. & W. boiler was 45,007 pounds; this was the total amount

week's trial of 130 hours was 62,310, which amount divided by 45,007 pounds of dry coal fired gives 1.38 pounds of iron per pound of coal, while from the furnace under the cylinder boiler 13,200 pounds of iron were produced from 11,551 pounds of coal, or 1.14 pounds of iron per pound of coal.

"The draft in the B. & W. boiler was generated by a steam jet in the base of the stack and was very light, being only 0.31 inch of water pressure. This enabled a consumption of only 346.2 pounds of coal per hour, while the heat from double that amount could have been easily taken care of by the heating surface. Under the cylinder boiler a force draft was used, and the coal consumption averaged 481.3 pounds per hour. This amount

hours, which figure, if taken, would reduce the coal consumption per horse-power during actual running time to 5.1 pounds, which result is better than can be obtained under cylinder boilers where the coal is burned directly upon the boiler grates and when the boiler is working at its point of maximum economy."

To show the fluctuations in the horse-power of the boiler from hour to hour the observations have been plotted in a series of diagrams, which we reproduce herewith, Figs. 4 to 9 covering the test of the Babcock & Wilcox boiler for the period under consideration, while Fig. 10 shows the result of the plotting of the same data for the plain cylinder boiler.

Test No. 7 deals with the results obtained with a Babcock & Wilcox boiler

over a heating furnace. The fluctuations in temperature to which a heating furnace is subjected are much less than those of the puddling furnace, so that the rate of evaporation of the boiler is quite uniform.

A more recent design by the Babcock & Wilcox Company for the utilization of waste heat over metallurgical furnaces is shown in Figs. 11, 12 and 13. It will be observed that there are three series of tubes, one above the other, constituting what is called the triple deck type, the principal object in planning this arrangement being to avoid the chilling of the furnace gases to such an extent in their passage past a solid block of tubes as to prevent their ready combustion. Two boilers of this design have been in operation at N. E. Ayer & Co.'s rolling mill at Portland, Ore., each boiler consisting of three decks of tubes, each of which has 36 4-inch tubes placed six sections wide and six tubes high, making in all 108 tubes 9 feet long. One cross drum is provided, which is 4 feet 6 inches in diameter and 7 feet 6 inches long. Figs. 12 and 13 show clearly how the entire structure is

boiler was measured by meter that had been previously corrected, which was placed between the pump and feed-water

ing down of the furnace in charging or putting in a new bottom. No coal was burned on the boiler grates, they being

	Sept. 12.	Sept. 13.
Heating surface per horse-power, square feet.....	8.2	7.96
Grate surface per horse-power, square feet.....	0.096	0.093
Coal burned per horse-power, pounds.....	6.0	5.32
Heating surface, each 1238 square feet.....	2,474.0	2,474.0
Grate surface (3 feet long x 4 feet 10 inches wide), square feet.....	29.0	29.0
Ratio of heating to grate surface.....	85.37	85.37
Kind of fuel used—Franklin coal, mined in Washington.....	Bituminous	
Duration of test, hours.....	12.0	11.0
Average steam pressure, pounds.....	91.2	90.3
Average temperature of feed water entering boiler, degrees.....	157.8	155.8
Pounds of coal burned, dry.....	21,760.0	18,230.0
Pounds of refuse.....	718.0	602.0
Pounds of combustible.....	21,042.0	17,628.0
Per cent. of ash.....	3.3	3.3
Coal burned per square foot grate per hour, pounds.....	62.5	57.1
Total water evaporated at temperature of feed, pounds.....	113,800.0	107,702.0
Water evaporated per hour at and from 212°, pounds.....	10,382.0	10,731.0
Water evaporated per square foot heating surface per hour at and from 212°, pounds.....	4.19	4.33
Water evaporated per pound coal—actual conditions, pounds.....	5.233	5.9
Water evaporated per pound coal, from and at 212°, pounds.....	5.724	6.46
Water evaporated per pound combustible—actual conditions, pounds.....	5.412	6.19
Water evaporated per pound combustible, from and at 212°, pounds.....	5.92	6.78
Quality of steam.....	Not observed	
Rated horse-power.....	240.0	240.0
Horse-power developed (horse-power = 30 pounds water evaporated per hour from feed at 100° and 70 pounds pressure).....	301.0	311.0
Per cent. above rated capacity.....	25.4	29.5

heater, thus insuring a nearly uniform temperature of the water passing through

covered with ashes. Both tests were commenced with a running start, the time being taken when the first heat was put into the furnace, and again when the last heat was withdrawn—the furnace at start and finish being at a white heat.

"September 12, 22,943 pounds box scrap was heated from 11,938 pounds of coal burned, equivalent to 1.92 pounds of iron per pound of coal.

"September 12, 15,022 pounds billet iron was heated from 9823 pounds of coal burned, equivalent to 1.52 pounds of iron per pound of coal.

"September 13, 21,966 pounds box scrap was heated from 9773 pounds of coal burned, equivalent to 2.24 pounds of iron per pound of coal.

"September 13, 16,000 pounds billet iron was heated from 8458 pounds of coal burned, equivalent to 1.89 pounds of iron per pound of coal."

S. M. Green of Milwaukee, Wis., has signed a contract with a committee of Salt Lake City citizens to erect at the latter place an electrolytical copper refinery, capable of refining and turning out 25 tons of pure copper products per day. The plant will be 185 x 350 feet in size, and will be operated by a 1000 horse power triple-expansion engine. The boilers will be capable of developing 1500 horse power. It is stated in the agreement that the cost of the plant when completed, as specified in the agreement, will be \$500,000, exclusive of the ground on which it is built, and that the works are to give employment to 300 men when running to full capacity. The work of erection will begin in 30 days. A bonus of \$100,000 and property sufficient for the purposes of the plant will be given, one-half to be paid upon the commencement of the work of construction, \$25,000 on June 1, provided the works are at that time half completed, and the remaining sum of \$25,000 on September 1, 1893, providing the works are then fully completed and in operation. The promoter of the enterprise gave a bond for \$100,000 to insure the successful carrying out of his part of the contract.

Strikes took place centuries ago, and with about as disastrous results as characterize the majority of the great labor struggles of the present day. At Breslau, in Germany, in the year 1329, brass workers inaugurated a strike which lasted for an entire year. In 1385 a strike of blacksmiths took place in Danzig, when the employers sought aid of the court, with the result that an order was issued by the municipal authorities that all workmen attempting to strike would have their ears cut off.

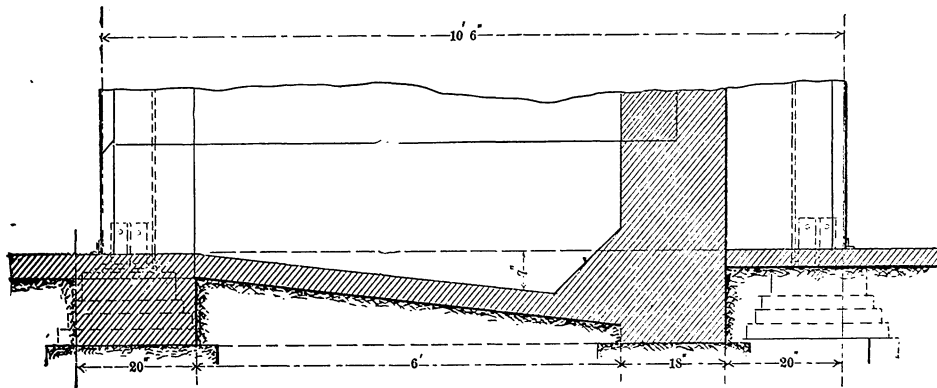


Fig. 12.—Section of Columns and Ash Pit.

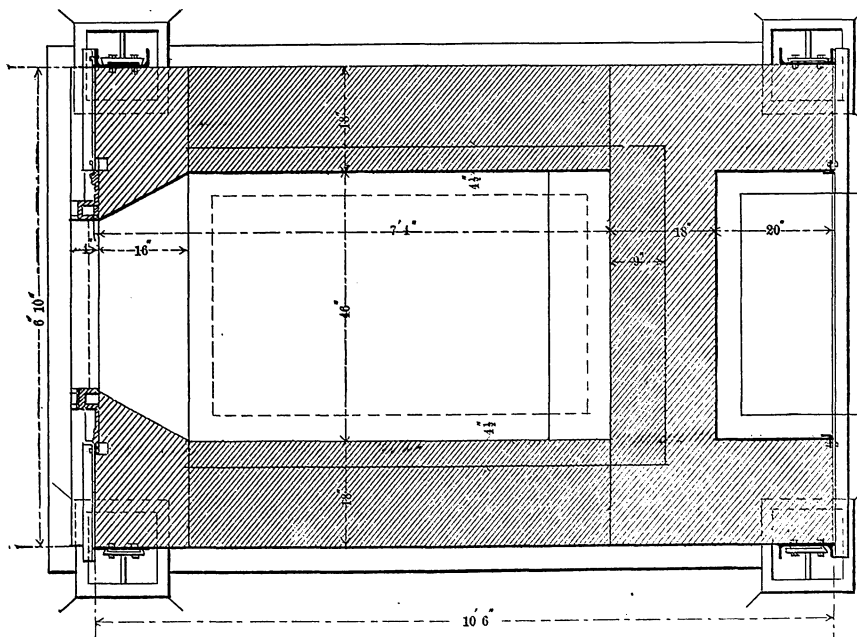


Fig. 13.—Plan of Columns and Ash Pit.

carried by four columns outside of the brick work, thus relieving the latter of any undue strains. The following tests, conducted by C. J. Wolfenden, show the results obtained with this type of boiler.

From the report of Mr. Wolfenden we quote the following details: "One boiler was operated by the waste gases from a box scrap furnace and the other from the waste gases from a 2½-inch billet heating furnace. The water pumped into the

meter. The coal was weighed upon platform scales that had been standardized.

"The draft was generated for the box scrap furnace by a No. 7 Scurtevant blower, running 1150 revolutions per minute, and for the billet heating furnace by a No. 6 blower of the same design and running at the same speed.

"Considerable variation was occasioned in the steam pressure and amount of water pumped into the boiler hourly by the cool-

Foundations of the Allis Engine at the World's Fair.

There are but few persons, outside of the engineering profession at least, who have any conception of the magnitude and cost of the preliminary steps necessary in the installation of exhibits of heavy machinery at the World's Fair. By a wise provision of the authorities, all foundations are required to be as substantially and carefully constructed as though the engine or other machine were to be permanently located thereon, instead of being required for but six months' service. This precaution is especially necessary with reference to large engines, for the reason that it is impossible to render them self-contained, and they must, therefore, depend entirely on their foundations for maintaining, unchangeably, the requisite relative positions of the several essential parts. Any failure in this respect would inevitably affect the operation of the engine, and might spoil the costly exhibit, even if results were not still more serious.

All foundations are of uniform character of materials and construction. They are built by the Exposition Company at the expense of exhibitors, and from plans furnished by them and approved by the management. In all cases where the nature of the ground at the bottom of the excavation is not absolutely reliable, piles have been driven to cover the entire area of footings, and any subsequent settling of foundations is therefore almost impossible. The largest engine on exhibition will be that of the Edw. P. Allis Company of Milwaukee, Wis. Its rated duty is 2000 horse-power, which is just double that of those next in size—there being several of 1000 horse-power exhibited by different makers. The engine is of the well-known Reynolds-Corliss type, and is compounded for quadruple expansion. Some idea of its size may be had from the dimensions of foundations, of which we present full detail drawings of the several views. By reference to the plan, Fig. 1, the concrete footings are seen to be 61 feet 6 inches by 32 feet, with an extension at cylinder end of 12 feet by 9 feet. The concrete is 2 feet thick, made of clean, crushed stone of uniform size, with Portland hydraulic cement. This is laid in four separate courses 6 inches thick, and rammed until it forms a

joints neatly pointed. At each point of support of the cylinders, girders, and pedestals, a single bearing stone is let into the brick work, the top coming flush with the surface of the latter, except in case of the first and second cylinders, as shown. These stones have a uniform thickness of 18 inches. They are of smooth-dressed Lamont limestone, such as is commonly

fourth cylinders arranged together, and each pair constituting a complete engine. The two piers have a common length of 57 feet 6 inches, and the width of that of first engine is 9 feet and of second 9 feet 9 inches. The depth from top of concrete is 11 feet 9 inches to top of foundation and 15 feet 1 inch to the center line of engines. The space from end to end be-

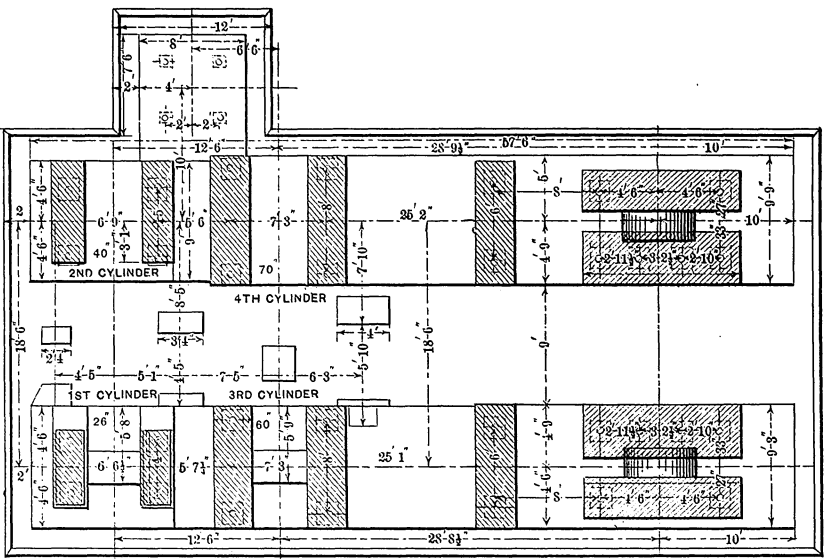


Fig. 1.—Plan

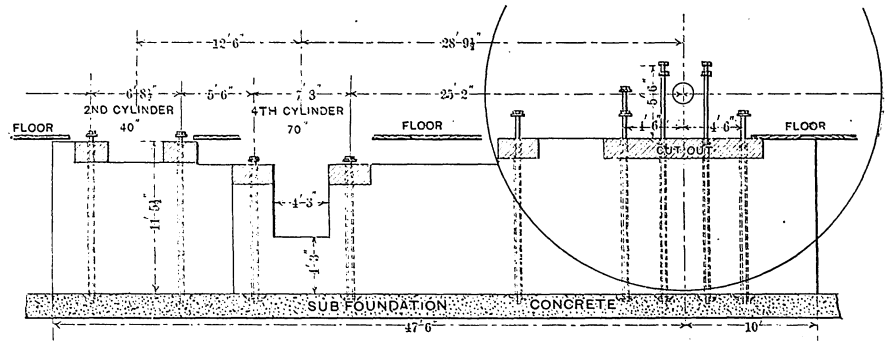


Fig. 2.—Elevation of Foundation of 2d and 4th Cylinders.

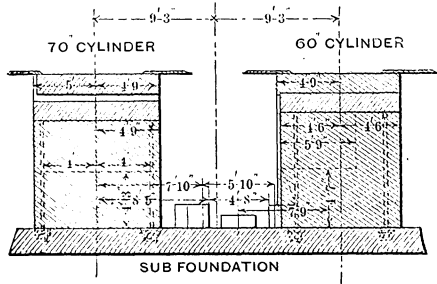


Fig. 3.—Cross Section Foundations of 3d and 4th Cylinders.

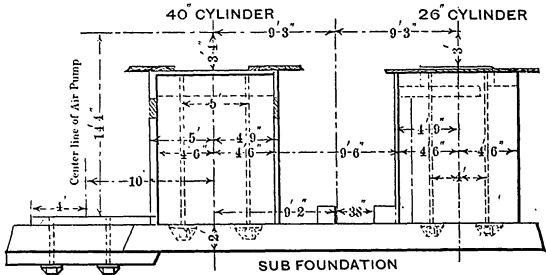


Fig. 4.—End Elevation 1st and 2d Cylinders.

THE FOUNDATIONS OF THE E. P. ALLIS COMPANY ENGINE AT THE WORLD'S FAIR.

perfectly solid and homogeneous mass. A batter of 6 inches at top is given to the edges, and 18 inches back from the latter the foundations proper are started. These consist of two solid piers of brick work, laid in hydraulic cement mortar, and bonded in courses throughout the entire thickness. The usual batter from bottom to top is omitted—the sides and ends being perpendicular. Although entirely below the floor line, the external faces of the piers present an appearance as neat and smooth as that of the walls of a building—the brick being of good quality, carefully laid in even courses, and the

used for this purpose in Chicago and vicinity. The largest, supporting the two main pedestals, are 12 feet long by 4 feet wide, and weigh about 12,000 pounds each. The foundation bolts, of which there are 18 for each engine, are 3 inches diameter. They are held at the lower end by heavy cast-iron washers, 12 inches square, which are let into the concrete footing so as to come flush with bottom surface of the brick work. As shown in the plan, the locations of the four cylinders indicate that the engines will be what may be termed a pair of "twin-tandem" design, the first and third and the second and

tween the piers is 9 feet wide, leaving a clear swing for the 30 foot fly wheel, with ample room around it, and no danger from flooding, as so often happens where the ordinary fly-wheel pit is used. The bond afforded between the piers by the continuous footing is depended on to prevent any independent movement of either foundation from the opposed motions of the two engines, as there is no other provision for counteracting this tendency. The engines are now in course of erection, with the expectation of having them completed and in operation by opening day, May 1.

The Telautograph.

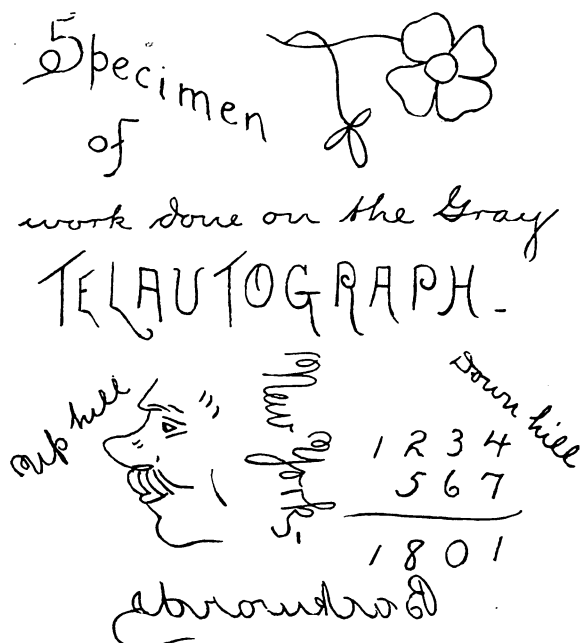
An invention that holds promise of ranking with the telegraph and the telephone as one of the epoch-making achievements of modern electrical science has just been promulgated. On Tuesday, March 21, was made the first public test of the telautograph, a long distance writing machine, the invention of Professor Elisha Gray of Chicago, which practically solves the problem of autographic communication over miles of wire. Representatives of the press were, by the invitation of the Gray National Telautograph Company, invited to witness the working of the new invention at their offices in New York and

The telautograph is, briefly, an instrument by means of which arbitrary signs, pictures, diagrams, figures, tabulated statements and cipher or short hand writings are transmitted, as well as ordinary hand writing, to any distance; what is written at one end being reproduced in *fac simile* at the other end of the circuit.

In an extended article on the subject, the *Electrical World* gives a full description of the machine and its history, from which we extract the following information. The telautograph consists of two machines, a transmitter and a receiver. The principle of the invention as technically described in the terms of Professor Gray's patent, is "the combination with two main circuits, each including a pole

circuits are involved in the transmission; and since it is a well-known fact that pulsations of successively opposite polarity can be sent over a line wire with greater rapidity and certainty of effect than pulsations of successively like polarity, alternating currents are employed in both these currents.

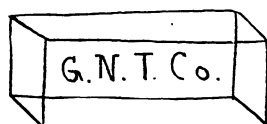
In the completed machine a series of contacts have been arranged, over which there wipes a brush, so that the number of pulsations in that circuit is determined by the distance which the pen is moved in that component direction, and the speed of succession of the pulsations varies with the rapidity of movement in that component direction of the transmitting pen. This pen or pencil (in fact, any



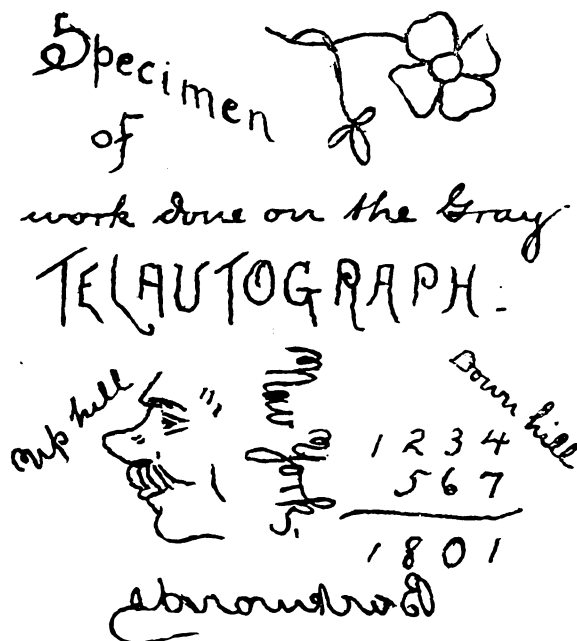
We can^{not} pay you today.

Here
are
a
few
lines
without

shifting the paper.



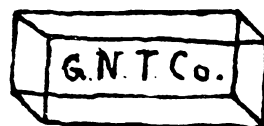
As Written.



We can^{not} pay you today.

Here
are
a
few
lines
without

shifting the paper.



As Received.

SPECIMEN OF WORK DONE ON THE GRAY TELAUTOGRAPH.

Chicago, where ocular demonstration was given of the practical utility of the system, to the complete satisfaction of those who witnessed the tests made.

Professor Gray's claim to be the first inventor of the telephone is well-known, and although this claim has, after prolonged litigation, been disallowed by the courts, many are found to dissent from the justice of that decision. The honor and credit of being the originator of the telautograph belongs to him, however, unchallenged. The original patent taken out for this instrument by Prof. Gray is dated July 31, 1888, since which time he has been engaged in perfecting his invention to the point at which it could be placed on the market in a practical form available for general use. This has now been accomplished and the telautograph is before the public as a commercial machine which, it is anticipated, will inevitably obtain a hold on business and social life similar to that possessed by the telephone.

changer, an interrupter, receiving magnet, and a polarized relay, arranged to direct the current through one or the other of the magnets according to its polarity, of a transmitting pen connected to operate said interrupters by its movements in two directions crosswise of each other; two local circuits, each including the magnet of one of the pole changers, and a circuit maker and breaker, which is also connected to and operated by the pen, to change the condition of its local circuit and thereby change the polarity of the current over the corresponding main circuit when the movement of the pen in either direction is reversed; and a receiving pen moved in two directions crosswise of each other through the action of the magnet of the respective circuits, and in opposite directions through the action of the respective magnets of each circuit, substantially as set forth."

As two motions, independent of each other, are to be reproduced, two electrical

pointed instrument may be used with the transmitting instrument) is attached by flexible cords at right angles to each other to two drums concentric with attachments on either side of the instrument. Rigidly attached to these drums are brushes which, as the drums revolve, sweep over the contacts in the direction of revolution. Also attached to each drum is a lever arm, which makes contact either with a front or rear stop, as the direction of revolution is backward or forward, thus changing the direction of motion at the receiving instrument simultaneously with that of the transmitting pen. The alternating current for each circuit is supplied by two batteries, one at either end, so connected as to oppose each other, the battery at the transmitter being usually of about twice the strength of the other.

The movements of the transmitting pencil are thus recorded by the winding and unwinding of the cords upon the drums and the motions of the brushes

regulating the current impulses, which at the distant station control the receiving pen. At the transmitting instrument the paper is fed from a roll which is moved by the sender as the length of the message requires. The course of this paper leads over a metallic plate some $2\frac{1}{2}$ inches wide and about 4 inches long. An area of this extent can be written on without motion of the paper. This plate, which forms an excellent writing surface, is also the connecting link between the two sets of batteries which supply the transmitting currents. Normally these are broken, and the receiving pen is held from contact with the paper at the further end by a spring actuated by a lever arm. The slightest pressure of the transmitting pen, however, upon the paper above the metallic plate is sufficient to close the circuit and bring the receiving pen in contact with the paper, ready to produce the characters transmitted. Whenever the transmitting pen is lifted from the paper, to commence a new line, cross a *t* or dot an *i*, the motions will be reproduced at the other end by the receiving pen. The latter, which is placed at the junction of two aluminum arms, consists of a glass tube drawn out at its end to capillary proportions and filled with an easily flowing ink, and automatically fed by a rubber bulb.

The instrument, in fine, is as simple as such an instrument can be, and may be as successfully operated by a child as by the most expert electrician; the reproduction of anything that can be written or drawn is as perfect as possible; and the communication between sender and receiver can be conducted with a secrecy as sacred as any sealed letter; no eyes but theirs need see the telautogram. In this latter respect it possesses advantages over either the telegraph or telephone which will be appreciated by business men.

It is proposed to follow out the line so successfully adopted in the telephone exchange business, subscribers being connected with each other through central exchanges and switchboard in exactly similar manner. The speed of transmission is only limited by the speed at which the subscriber is able to write. The average speed would probably be from 25 to 30 words a minute. The current employed in the telautograph is about the same as that employed in the telegraph, and the distances it is possible to reach are about the same as those that can be reached by the Morse signals, without relays, that is, about 500 miles. The relay system will probably be eventually adopted, so that, as the *Electrical World* remarks, "the time may not be far distant when the banker in New York may attach his autograph to a check in San Francisco as readily as he now communicates with his broker through the intervention of the Morse code and the telegraph operator."

The cut which accompanies this sketch, reproduced from the *Electrical World*, represent a telautographic message as written and received through an artificial distance representing one mile. This shows clearly the fidelity of the reproduction. Printing, script, and sketches transcribed horizontally, uphill, downhill and backwards are all with equal faithfulness copied by the receiving pen. The illustration shows the exact size of the transcribing plate.

The importance of the new invention in its relations to the commercial, industrial, press and social worlds is something that cannot at present be estimated. The exact reproduction of messages at a distance will obviate many inconvenient mistakes, and the transmission of fraudulent or wantonly misleading messages will be rendered less easy than is the case by telephone or telegraph. For police purposes it will be found valuable in transmitting the lineaments of people who are "wanted"

by the representatives of their country's laws.

When the telautograph attains general adoption there will be a reasonable justification for such cases of skepticism as that recorded of the old Scotchwoman in the early days of the telegraph, who indignantly denied the authenticity of a message sent to her by an absent son through that novel and strange channel, saying, "She knew Rab's han' writin' weel eno' and they werna' her bairn's marks."

To quote in conclusion once more from our electrical contemporary: "Now that we can recognize the voices of our friends and communicate with them in autograph over miles of wire, there would seem to be but one step left for the future by which space may be totally annihilated—namely, that we may also see our friends as they speak and write. What genius will enable us to do this?"

The Scully Steel & Iron Company.

The Scully Steel & Iron Company have removed from 64 South Canal street to their new warehouse at 136 to 146 Fulton street, Chicago. This warehouse, which has been specially fitted up for their purposes, is undoubtedly one of the best appointed plate stores in the country. The building is a one story structure, 130 feet long by 170 feet deep and 30 feet high to the square, extending from Fulton street in front to Wayman street in the rear. It is divided into several compartments. The offices extend along a considerable part of the Fulton street front, opening into the warehouse in the rear, the level of which is several feet lower than that of the office. The plate room occupies half of the building on one side. On the other side are the sheet and bar room, with the tube room in the rear. Rivets are stored in a spacious room extending under the Fulton street side walk. Pneumatic lifts or trolleys, with a vertical range of 6 feet and a carrying capacity of 3 tons each, run on overhead railways from one end of the warehouse to the other, enabling the heaviest plates to be handled with ease by one or two men and taken from any part of the warehouse to wagons in the rear.

There are three wagon entrances to the building. Thus plates can be received or shipped at one door, sheets at another and boiler tubes at the third, while rivets are being handled through a sidewalk opening in the front. Teams with boiler tubes and sheets can be driven directly to the racks where they are stored. These racks are quite a feature of the sheet and tube departments. Racks are vertical for large sheets, which stand on end along the wall, and horizontal for small sheets and tubes. Three large tube racks will hold 100 tons each, there being additional racks for smaller sizes. In the plate department the larger sizes are laid flat and the smaller sizes stand in vertical racks or compartments. The whole warehouse is well-lighted by skylights in the roof. Electric light will be used when necessary on short days in the winter. Every detail has been carefully studied with a view to securing the best arrangement possible for handling stock expeditiously and with the minimum of labor.

The offices have also received very careful attention. They are spacious, lighted with large windows and well appointed in every other particular. Georgia pine has been used for walls and ceiling, while the floor is of hard wood. All the modern conveniences for the facilitation of business have been introduced. Steam heat will be used. The location is an admirable one for the transaction of both local and outside business. It is in the center of the district devoted to the manufacture of boilers and machinery and within easy

reach of freight depots, both rail and water. The enterprise which the company have shown in so greatly improving the facilities should meet with a substantial return in largely increased business.

The Decline of Boston as a Speculative Center.

There is much lamentation, the *Boston Review* says, over the more and more second rate position which that city is being forced into as a speculative center. "The time was," the editor says, "when Union Pacific found here its main market, when Atchison was almost unknown on the New York Stock Exchange, when Chicago, Burlington & Quincy could hardly be dealt in there for lack of sufficient certificates on the street. With the collapse, however, in Union Pacific & Atchison, and the depression in Chicago, Burlington & Quincy since the great strike of 1888, large amounts of floating stock in each of these companies have found their way to New York, and the New York transactions in them, as compared with the Boston transactions, are something like ten to one. All the initiative in their movements likewise comes from New York, and it has been said, with some truth, that the Boston Stock Exchange really opens at two minutes past ten—on receipt, that is, of New York quotations. If by any chance New York has a holiday, the Boston Stock Exchange closes. Moreover, there is a constant drift of securities to the larger market. The Illinois Steel Company securities have just been listed on the New York Exchange, though hitherto dealings in them have been principally, if not entirely, confined to the unlisted department of the Boston Stock Exchange. And the consolidation of the Edison and the Thomson-Houston Electric Companies into the General Electric Company has meant the loss to Boston of an independent market for a stock which represented a great and growing industry.

The real market in Boston for stocks seems to be confined more and more to copper stocks, electric stocks of less consequence than General Electric, and purely local stocks. Of the last class, the local railroad stocks seem more likely to leave than would have been thought possible until very recently. For years Boston has done little more than echo New York in dealings in New York & New England stock, and a Philadelphian is now President of that Company as well as of the Boston & Maine. The Old Colony also has just passed into New York hands, and the "partition of Poland" between the New Haven and Boston & Maine railroads, and the constant talk of Vanderbilt purchasing of first this and then that local railroad, suggest that Boston control of New England properties may, before long, be a thing of the past. Boston people have long blamed one another for not having owned the great railroad connecting New England with the West, and for having invested in roads in the far West which not only could do nothing for Boston as a port, but have too often given a very poor account of themselves to their owners. Now this proud and rich city would seem to be in danger of losing control of the New England railroad companies themselves, which lead to her very gates.

The workmen employed in the Tyne and Wear engineering trade in England, about 15,000 in number, have received from their employers notice of a reduction of 10 per cent. on all wages above 20 shillings per week, and of 5 per cent. on wages at or below that figure, to take effect from May next.

Capitol Pipe-Threading and Cutting-Off Machine.

The Capitol Mfg. Company of Chicago have made quite a radical departure from present methods employed in pipe-threading machinery, having adopted for this special service the methods used by them in threading and milling rods and bolts and cutting off iron and steel. Instead of revolving, the pipe being threaded, it is held stationary and the threading head, which contains the dies or chases, revolves. We have repeatedly referred to the principles involved in the design of the Adams automatic threading head, which the Capitol Mfg. Company used in their machinery. In this case it is simply larger in dimensions. It opens and closes automatically like the regular bolt-threading machinery made by the company.

By reference to the accompanying engraving, it will be observed that on the opposite end of the bed to the threading head is a chuck which grasps the pipe

The machine takes up little room and does the work quickly. The engraving represents the #4 machine with a capacity from $\frac{1}{4}$ -inch to 4 inch pipe. The machines are made in all sizes up to 16 inches. The machine can also be used advantageously for threading and milling rods and bolts and for cutting of iron and steel.

Diamond-Making and the Electrical Furnace.

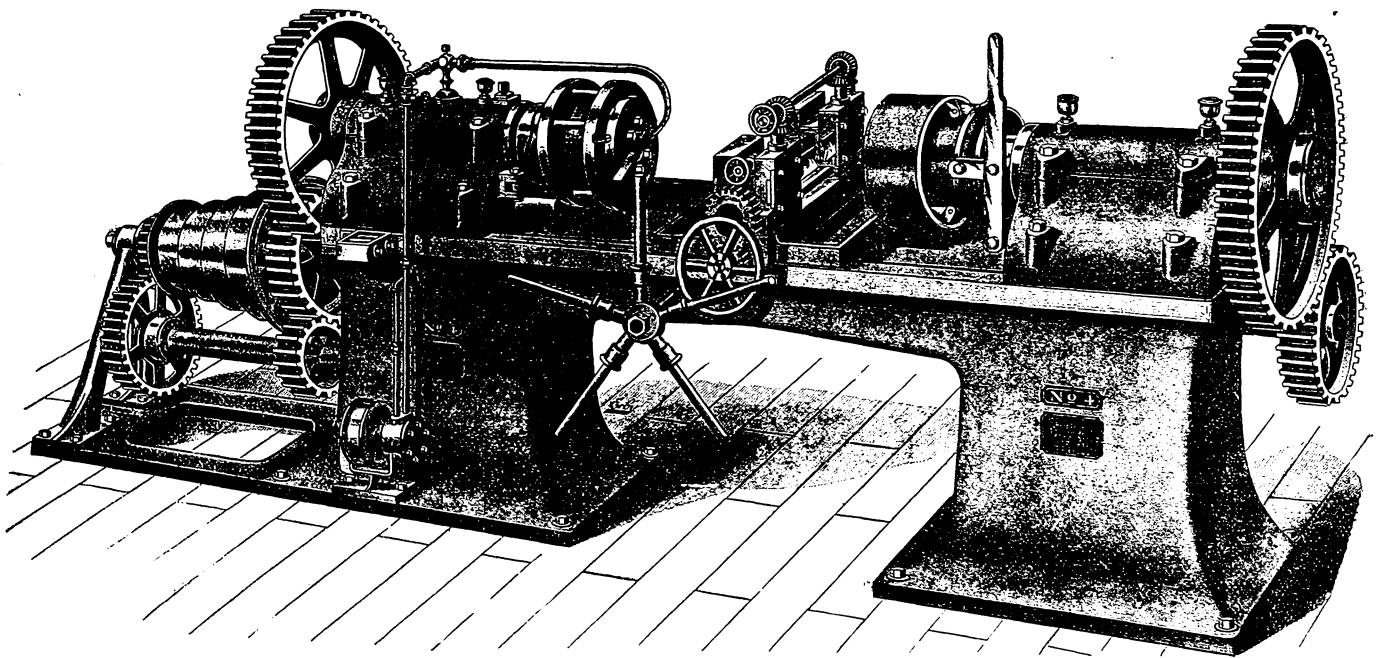
In *The Iron Age* of February 2, an account was given of the employment of a small electrical furnace by Henri Moissan, an eminent French scientist, in conducting certain scientific investigations rendered possible by utilizing for such purposes the intense heat generated by the electric arc.

Continuing his work in the practically new field of research thus opened, M. Moissan has recently been able to report to the French Academie des Sciences that he has succeeded in producing diamonds artificially. While this achievement is a

By the use of the electrical furnace, which enabled him to accomplish the results already noted, M. Moissan has also been very successful in the reduction of certain metals, and has recently reported the results of his laboratory work in this direction.

The rare metal uranium was procured from its oxides, which are practically irreducible at any temperature ordinarily obtainable by other means than the electric arc. An ingot of uranium, weighing several ounces, was yielded in less than a quarter of an hour. Small ingots of chromium and of manganese were produced even more quickly, although their reduction by other processes usually absorbs considerable time.

Coal Dust Explosions as a Motive Power.—Accounts come from Germany that Krupp, the famous gun maker, is now building a number of experimental engines to test a novel idea. A German inventor has taken patents on the utilization of the general principle that finely divided



THE CAPITOL PIPE-THREADING AND CUTTING-OFF MACHINE.

after the thread has been cut to proper length. One movement of the lever holds the pipe sufficiently well for cutting off purposes. The cutter itself is fastened in a holder which is located in the vise jaws on a carriage by the cutting head and the gripping chuck, as seen in the engraving.

The cutter used for cutting off is a regular cutting-off lathe tool, while the vises on the carriage act as steady rests and are self-centering. The threading dies are flush with the head holding the same, and short pipe can be threaded on both ends its entire length. The cutting off tools can be moved to cut the pipe any desired length, and the machine can be used for both cutting off pipe into short or long lengths. The threading dies are just the same as those used on the Adams bolt threading machines. They are durable and can be reholed several times.

Both spindles are hollow and are provided with collars on the inside to prevent the pipe from sagging or bending. The oil or lubricant required for threading purposes is held in the basin of the machine and is pumped by means of a rotary pump and used over and over again. The supply can be regulated to suit the requirements.

matter of scientific and popular interest, it is as yet of no commercial importance. The diamonds obtained, although undoubtedly genuine, are exceedingly small in size, and serious difficulty would be experienced in employing on a larger scale the process which has yielded them.

Without going into the details of the study and research resulting in the successful solution of a problem which had so long defied attack, it may be said that the end desired was not accomplished by chance nor in a hap-hazard way, but was gained by means of patient reasoning and experiment and at a considerable cost both of time and money.

Briefly stated, the process consists in causing the absorption of a quantity of carbon by molten iron subjected to intense heat in a small crucible within an electric furnace, the crucible and its contents being then plunged suddenly into ice water. The result is a formation of a shell or crust of iron which hardens quickly, while the interior is still in a state of fusion. Under these conditions the cooling of the inner portion causes the excess of carbon to assume the form of minute diamonds imbedded in the iron. The diamonds can then be obtained by applying strong acids to dissolve the iron.

carbonaceous matter floating in the air readily explodes. He proposes to grind coal to an impalpable powder, and after introducing the dust floating in the air into the cylinder of an engine, explode it, the idea being to follow very much the same lines which are being so thoroughly developed in the use of gas in engine practice. Naturally, the first question which has risen has been how to get rid of the ash. Krupp is reported to have stated that his experience in gun manufacture convinces him that this is not a serious obstacle. The advantages which would grow out of a direct utilization of mineral fuel as mined are very obvious. While modern practice converts only 10 to 15 per cent. of the heat energy stored in coal into power at the crank shaft of a steam engine, it is believed that no less than 75 to 80 per cent. could be made available by the direct combustion of the fuel through explosion of coal dust.

A 5 per cent. reduction in wages has been agreed upon between the mine owners and miners in the Durham and Cleveland districts in England. In each case a reduction of 10 per cent. was asked for by the employers, but was successfully resisted by the men.

The Prentice Single-Spindle Drilling Machine.

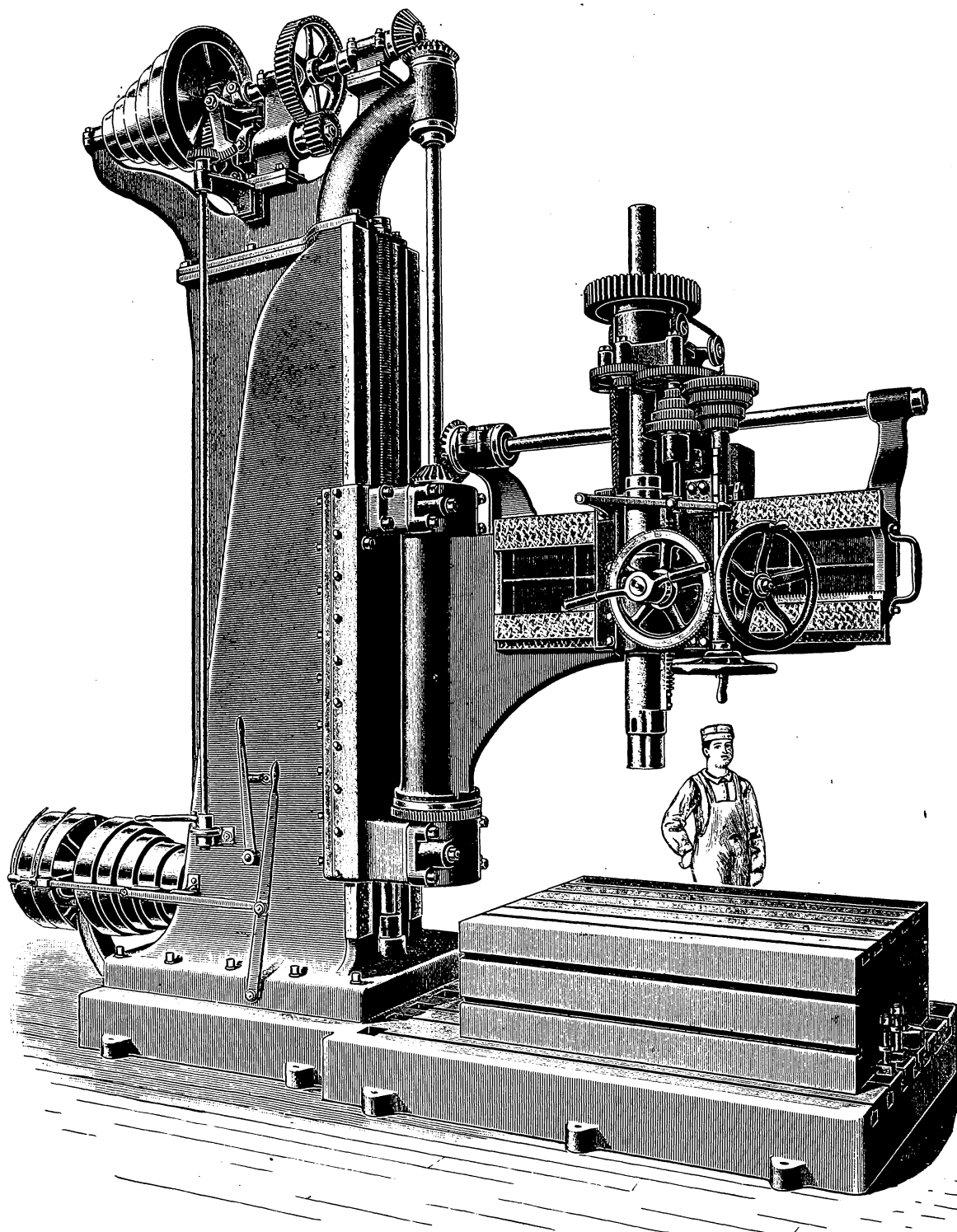
Prentice Brothers of Worcester, Mass., have just finished what is said to be the largest single spindle drilling machine ever built in this country. It is now at

feed. The head carrying the spindle is moved along the arm by a hand wheel. The changes of feed are obtained by a pull spline, locking the different feed gears together. The machine is gear driven from the horizontal top shaft.

An idea of the size of the drill may be formed from the fact that it will drill to the center of a 26-foot circle, and that the

tian and South African lines and traversing the entire continent.

The consumption and production of various metals in France show the following comparison, as presented in the latest official returns: Of lead, the consumption is 60,500 tons, of which 11 per cent. is produced in France; of zinc, the con-



THE PRENTICE SINGLE-SPINDLE DRILLING MACHINE.

the Pittsburgh Locomotive and Car Works of Allegheny City, Pa. The drill measures 16½ feet in height and occupies a floor space of 15½ x 5½ feet and weighs 34,000 pounds. The bracket supporting the arm is gibbed to the upright column and has a vertical adjustment by power, operated by the hand lever shown on the base of the column. The spindle is counter-balanced, has a quick return movement, hand and power feed and four changes of

greatest height from the spindle to the base is 96 inches.

Another step toward opening up the interior of the "Dark Continent" is noted. The African Transcontinental Telegraph Company have been chartered in London with the object of establishing through telegraphic communication with Central Africa, connecting with the Egypt-

sumption is 47,000 tons, and production 44 per cent.; of copper, 28,000 tons and 3 per cent.; of tin, 5200 tons and production nil; and of nickel, 921 tons and 36 per cent. France is therefore indebted to foreign countries for 89 per cent. of its consumption of lead, 56 per cent. of its consumption of zinc, 92 per cent. of its consumption of copper, the whole of its consumption of tin, and 64 per cent. of its consumption of nickel.

The Merriam Percussion Fuse.

In *The Iron Age* of March 30, 1893, in the article "Trial of the Dynamite Gunboat 'Vesuvius,'" we illustrated and described very fully the Rapiéff fuse, which was the one employed throughout the recent test. In order that this fuse may be compared with the one designed by Henry P. Merriam we take the following description by Mr. Merriam from the *Journal of the United States Artillery*:

in a recess in the fuse case; the percussion caps, of which there were three, were circularly disposed in front of the spherical hammer. This arrangement of hammer and caps is similar to that shown in Fig. 1. The action of this is such that a direct axial retardation of the shell causes the ball to strike all three caps simultaneously, while a side blow causes the ball to be displaced laterally and to move forward in the cavity, thus coming in contact with one or more of the primers. In this fuse the safety device consisted of a small weight and a spring which positively held the ball away from the caps until the shell

the base of the shell and that applied to the small releasing weight of plunger. This relation may be stated thus:

Total force acting on base of shell	=	Total weight of shell
Force acting on plunger	=	Weight of plunger

This is strictly correct only when the shell and the plunger are regarded as freely moving bodies; the total force imparting velocity to the shell is less than the total force applied by an amount necessary to overcome friction, to set up the rotation of the shell, &c. If the force applied to the starting of the plunger is

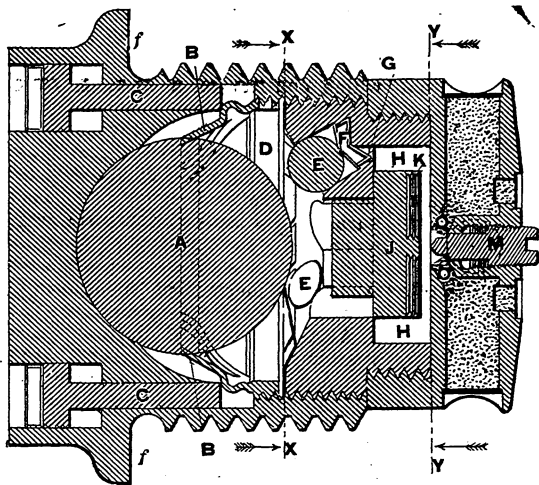


Fig. 1—Vertical Longitudinal Section.

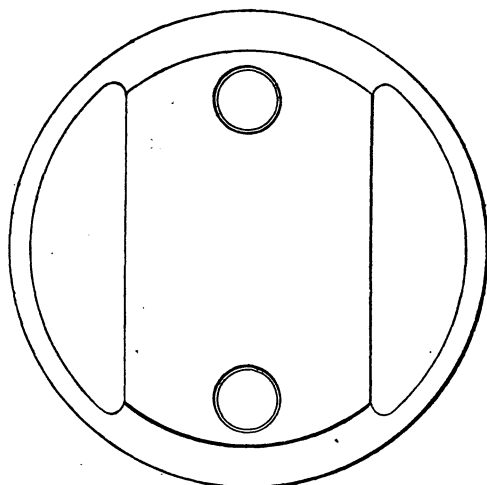


Fig. 2.—Rear Elevation.

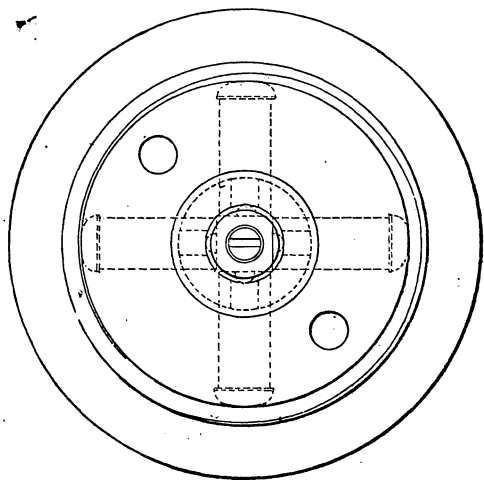


Fig. 3.—Front Elevation.

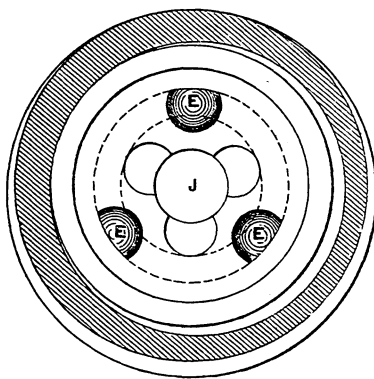


Fig. 4.—Section on x x of Fig. 1.

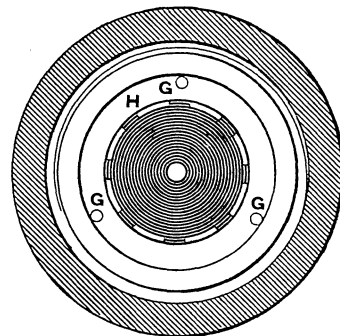


Fig. 5.—Section on y y of Fig. 1.

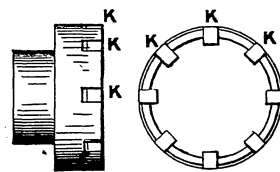


Fig. 6.—Valve for Controlling Delay.

THE MERRIAM PERCUSSION FUSE.

The fuse to be described in this article was the outcome of a series of experiments made at the Sandy Hook Proving Grounds during the years 1890-91. It was the purpose of these experiments to produce a base percussion fuse which would be suitable for shells of the larger calibers, and more especially for rifled mortar shells. The chief requirements to be fulfilled were:

1. Safety in handling and transportation.
2. Certainty of action upon concussion on a target—this to mean that a burst should occur whether the shell strikes point foremost or sidewise.
3. Delay after concussion, to allow time for the shell to penetrate before exploding.

The first fuses to be fired were made with a spherical hammer mounted loosely

was fired; then the small weight, in taking up the velocity of the shell, was forced over the spring and the spring and weight retreated together into the ball. Several of these fuses were fired from an 8-inch M. L. rifle with satisfactory results. On further trial of this type in a 12-inch B. L. mortar, two out of the first three fired failed to explode. These two were recovered and it was found that the safety device had not been released. To investigate this point further, experiments were made with a 3.6-inch B. L. field mortar, using small charges; the shells, not being loaded, were recovered and the fuses examined. The results thus obtained served to confirm previously-calculated results as to the relation between the total force applied to

calculated by the above equation, using the pressure per square inch as given by a crusher gauge, the result obtained represents the greatest possible force to which the plunger can be subjected in starting—frictional and other losses being neglected. The actual force applied is always less than this theoretical amount—some experiments showed a loss of upward of 50 per cent.; this, however, may have been largely due to irregular friction of the plunger. To illustrate by an example: Suppose a shell for a 12-inch B. L. mortar weighs 650 pounds; that the maximum pressure applied in its discharge is 6000 pounds per square inch—this being, perhaps, the extreme lowest pressure that would be used; the plunger may be assumed to weigh 2 ounces. The total force applied to the

base of the shell equals $6000 \times 113 = 678,000$ pounds.

$$\frac{678,000}{x} = \frac{650}{\frac{1}{2}} \text{ from which } x = 130$$

This is the maximum limit of the force applied to the starting of the plunger. As is usually the case, the plunger is pierced by a pin or spring which is forced through the plunger at the instant of discharge, this action serving to arm the fuse. For safety against premature explosion considerable force is required to overcome the friction of the pin or spring. If with such a plunger as this it is assumed that a force of 130 pounds is necessary to start the pin, then, theoretically, the fuse would just be capable of arming by the shock of discharge.

To see to what extent such a fuse can be roughly handled: Suppose that the pin can be forced $\frac{3}{8}$ inch through the plunger, and that the frictional resistance of 130 pounds is constant for this travel. The energy necessary to arm the fuse is $130 \times \frac{3}{8} \times \frac{1}{2} = 2.03$ foot-pounds, and the height from which 2 ounces, the weight of the plunger, must be dropped to give this amount of energy is $\frac{2.03}{\frac{1}{8}} = 16.2$ feet. If

such a fuse be dropped 16 feet and its velocity be suddenly checked by striking squarely on its base the fuse will be effectually armed; but to be reasonably sure that this will take place when fired under the conditions stated the fuse should be capable of arming with a drop of about half this distance. This, then, reduces the fall to 8 feet, which is much too small, and, moreover, a succession of shocks or falls from a less height will have the same effect as the single drop of 8 feet. It is apparent that there is not margin enough between safety on one hand and certainty of action on the other, and for this reason there is required some means for releasing the plunger that in its action shall be more positive than the inertia of a weight; for to change merely the proportions of the weight and resistance will not solve the difficulty.

The gas pressure at the base of the shell presented a satisfactory means for operating the releasing device, and accordingly, experiments were made with a type embodying this principle. To avoid unnecessary expense: 3.6-inch field mortar and a 3.6 inch field gun were used. Fuses were fired under pressures varying from 3000 to 38,000 pounds per square inch, and as no failures occurred it was concluded that their certainty of action was fully established; as a final proof, however, a number of shells were fired successfully from a 12 inch B. L. mortar. During these experiments some difficulty was encountered in shells bursting in the gun, but this was not attributed to the action of the fuse; for, as was afterward shown, bursts occurred with equal frequency in the firing of shells from the same lot, loaded with powder, but with the opening in the base closed by a base plug instead of a fuse.

The delay was next taken up. To discuss this part more clearly take the case of a loaded projectile without a fuse—sometimes known as a "blind shell"—fired against armor. It is a well known fact that when the armor exceeds a certain thickness—this thickness varying with the size and character of the projectile—the heat developed at the instant of concussion is sufficient to ignite the contained bursting charge and cause explosion after the shell has passed through. With a still more resisting target the heat would be more intense and more quickly developed, and the burst would then occur before penetration, in which case comparatively little damage would result, unless the explosion be so violent as to shatter the plate. Attempts have been made to overcome this difficulty of premature bursting

by inclosing the charge in non conducting bags, but no advantage has been thus secured. For this reason it is considered advisable by some authorities to dispense with bursting charges in projectiles for use against armor, and to trust to the destructive action resulting from the penetration of such a missile into the body of a ship.

In cases, however, where the resistance encountered is insufficient to develop the required amount of heat a fuse is a very necessary part of the shell and greatly increases the destructive effect. The greater proportion of war vessels are not provided with such effective protection as would require explosive projectiles to be dispensed with, and against these vessels armor-piercing shells, loaded and fused, would do most effective work. If examination is made of the action of a shell at the instant of concussion, it is seen that there is required a certain brief interval of time—about 0.005 second—in which to set up the action of the fuse and develop the force of the bursting charge. This cause a certain delay, but a delay in addition to this is necessary at times to insure complete penetration. To secure so short an interval of time by a train of powder is impossible; by restraining the plunger in its movement toward the caps a limited delay may be obtained, but this renders the fuse less sensitive, and, moreover, would cause a shorter delay with a thicker target, which is the reverse of what is wanted. What is required is that the delay be proportional to the resistance overcome by the projectile in penetrating the target—i. e., if thin plating is encountered the shell should explode with no delay beyond the time required to ignite the charge; while if thicker plating is encountered the time before exploding should be proportionally greater; this discrimination should be made automatically.

It was with a hope of realizing, in a measure at least, this action that experiments were made on delay. At first the arrangements tried were complicated and the results showed that they were too slow in action, the shells bursting about 75 feet behind the target, which was of 3 inch plank; finally the arrangement shown in the accompanying diagram was tried and this showed a marked improvement. With this device shells were fired from a 3.6-inch field gun through a 3 inch plank target, through a 4 foot butt of sand, and a plank target of varying thicknesses: shells fired through the 3 inches of plank burst about 5 feet beyond, and with a thickness of 52 inches of plank the burst occurred at practically the same distance in the rear. About 30 shells were fired in these experiments and the results were highly satisfactory. The final proof that the delay is proportional to the resistance would be a trial with armor-piercing shells fired against armor plates. So far this has not been attempted.

The fuse as now constructed will be readily understood from the following description and diagram:

Fig. 1 shows a longitudinal section of the fuse, showing parts as they exist previous to firing.

Figs. 2 and 3 are end elevations.

Figs. 4 and 5 are sections along xx and yy , respectively, looking in the direction of the arrows.

Fig. 6 shows, in separate view, the valve upon which the delay action depends.

Referring to Fig. 1, in the fuse case, which screws into the base of the shell, plunger or hammer A, for exploding the caps, is in the form of a sphere. This is held securely in the position shown by the clips B B, which abut at one end against a circular recess in the ball, and at the other end against a shoulder in the fuse case. When, in the discharge of the shell, pressure is applied to

the trips C, the clips B B are forced off from the shoulder in the fuse case and thus free the hammer A. A flat spring D serves to keep the ball to the rear of the cavity during the flight of the shell.

When the velocity of the shell is suddenly checked upon striking a target, the ball, by its momentum, strikes one or more of the small balls E—see also Fig. 4—placed above the fulminate caps F and explodes the latter. The resulting flame escapes through the channels G—see also Fig. 5—into the chamber H. It is also evident from the arrangement of the ball A and its surrounding cavity that should the shell strike squarely on its side, the ball in being thrown to one side of the cavity is forced to move forward and thus explode at least one of the caps. In the chamber H is placed the delay mechanism, which consists of a disk, I, of closely pressed powder carried on the front of the valve J. This valve is capable of a slight movement in an axial direction. This disk of powder when compressed between two surfaces and ignited at the edge burns in successive concentric rings, and it requires an appreciable time for the flame to reach the center; when the disk is not thus compressed, the igniting flame reaches the center immediately.

At the instant of impact the sudden stopping of the shell causes both the hammer A and the valve J to move forward, but the valve J, on account of its shorter travel, reaches its seat an instant before the hammer strikes the caps. When the flame from the fulminate caps enters the chamber H, the valve J is pressed firmly against the front surface and the flame ignites the edge of the disk of powder through the windows K—see Fig. 6. As long as the shell is undergoing retardation the disk I remains forced against the forward face and the flame advances slowly, as before stated; when the shell has passed through or has stopped in the target, this force, due to the momentum of the valve, ceases and the gas pressure between the two surfaces forces the valve away from the forward face, thus allowing the flame to at once reach the center. A wisp of dry gun cotton closing the channels O serves to conduct the flame to the powder contained in the radial chambers L, and from thence it passes to the bursting charge in the shell. These chambers L contain supplemental flashing charges to further insure the ignition of the bursting charge.

A screw, M, when screwed down serves positively to hold back the valve J, should it be desired to have the explosion as nearly instantaneous as possible at all times.

The pistons on the trips C are rendered gas tight by means of copper caps—arranged after the usual manner of crusher gauges—and tallow or wax fills the space above these.

When screwed into the shell, leakage of the powder gas by way of the threads is prevented by a washer at the shoulder *ff*.

The small balls E are secured in place by being set in the recesses somewhat deeper than half a diameter; a burr at the edge of the recess then holds them.

The safety of this fuse in handling has been abundantly tested by dropping and throwing about. As for certainty of releasing upon discharge, this is fully secured by the size of the pistons and the fact that there are two; either one releasing being sufficient. Certainty of exploding upon striking is secured by employing three percussion primers instead of one; that three defective caps should happen to be in the same fuse is well-nigh impossible. Finally, the delay mechanism for mortar shells would seem to be all that could be desired. It may be said by way of anticipating a criticism that the apparent complication is due to a duplication of parts

which secure greater certainty of action. Over 60 of these fuses have been fired and not one has failed to act.

CANADIAN NOTES.

(By a Special Correspondent.)

The third session of the seventh Parliament of Canada was prorogued on the 1st inst. It was one of the shortest since confederation, and was not more fruitful than it was lengthy. In trade legislation it was especially disappointing. The Premier and the Minister of Finance had led the country to expect a revision of the tariff. Apparently no such idea was seriously entertained by the Ministry, for the very consideration of a revision is now deferred for another session, that the country may be thoroughly sounded on the question. The duties on bar, hoop and sheet iron, as well as those on puddled bar and wrought scrap were expected to be altered, and strong representations were made to the Government of the anomalous and unfair effect of these duties upon manufacturers who used the three first-named classes of iron as material. Barb wire also bears a duty that increases in unpopularity. From the Northwest, where there is no other fence material used but wire, there were numerous vain petitions for the removal of the duty upon it. The duty was lowered from 25 to 12½ per cent. on binder twine. A measure was passed to amend the Internal Revenue act, so as to allow of petroleum being carried in tank cars. This has affected the price of both Canadian and United States oil very appreciably.

A Dominion insolvency act was expected this session. The leading boards of trade of the country had jointly drafted a bill for submission to parliament a year ago, but it was carried over to this session. It never found its way before either house. The commercial treaty with France, though signed by Canada's representative and agreed to by the British and French governments, was not ratified by our parliament.

The arraignment of the tariff as the parent of combines, was a disadvantage against which schemes of commercial amalgamation had to struggle this session. The merging of the three sugar refineries of Nova Scotia was frustrated by the commerce and railways committee, but it is expected that the Legislature of Nova Scotia will give the required charter and incur the risk of federal disallowance. Efforts were made to bring the disallowing power into operation to dissolve the monopoly granted by the same Legislature to the Dominion Coal Company, better known as the Whitney Syndicate. The bill of the Canadian Gas Association was very greatly modified in committee in favor of municipalities.

The high rates of interest ruling in New York have caused the movement of considerable quantities of money from Montreal and Toronto to that market. Some of our banks that have branches in New York, and others that have agencies there, created a flutter in stock speculating circles by suddenly withdrawing all call loans for the purpose of shipping money to New York. This caused a sharp spell of realizing, and several stocks went down in consequence.

St. Lawrence river navigation is likely to open much later this spring than it did last year.

The quantity of the Scotch and English pig iron imported into Canada grows less every year. The competition of United States iron is displacing it very generally

in the West. British iron can be laid down in Montreal at prices equal to or probably lower than United States iron can, but at points further inland the advantage is in favor of the American iron. Thus the internal freight is a determining factor in the competition between the two irons. It is expected that dullness in the shipping trade this spring may benefit the British iron in the Canadian market. But comparative cheapness is not the sole advantage in favor of American iron. Convenience is a matter of still greater moment. Consumers have to order British iron in large quantities and to pay for it at once. On the other hand they can limit their orders of American iron to a carload, and can get it in ten days at the furthest. Thus they save interest and storeroom. The difference in methods of grading British and American iron is said also to secure greater uniformity in the quality of the latter than is usually found in the former.

Some enterprising traders made a little money this season by importing galvanized, annealed and oiled and annealed wire from the United States. The disparity between the prices ruling on the two sides of the border afforded the chance which enabled this to be done. Our manufacturers had lowered the price in the staple sizes last fall, but evidently not enough to effect the purpose aimed at—namely, the exclusion of wire from the United States. They made a further reduction a few weeks ago, but in the interval a good deal of wire had been brought across the line. Even since the latest reduction there has been some importing done. Hardware jobbers were unable to avail themselves of the cheaper prices of outside manufacturers, as by importing they forfeit a rebate which is held back by the associated Canadian manufacturers. The jobbers were consequently considerably chagrined to see the trade in wire passing into the hands of other traders who were not in the compact with the Canadian manufacturers.

The report that a Boston syndicate had secured options on all the smelting works, rolling mills and steel plant in the Maritime Provinces, and were negotiating to purchase the three rolling mills of Montreal, is denied in its relation to the Montreal works.

Ten cars of machinery for the extension of the trolley car system in Toronto arrived a few days ago from Providence, R. I.

The Gurney Foundry Company of Toronto recently placed an order for 2000 tons of Tonawanda pig iron.

The trade in white lead, which has been sadly demoralized for some months by cutting among the grinders, is now on a satisfactory basis, the manufacturers having entered into an agreement to keep the price of pure lead uniform.

The plate glass jobbers of Toronto have revived their association.

The Doty Engine Works Company, Toronto, have been running till ten o'clock every night since the beginning of the year with the view of being able to get all their contracts out on time. This company is identical in composition with the firm of Bertram & Co., wholesale hardware merchants in Toronto. They have numerous orders on hand for constructing Roberts' Safety Water Tube Boilers, which they manufacture under license from the patentee.

A novel application of aluminum was made by a Toronto hospital surgeon a few days ago. A patient had an enormous swelling on the abdomen which it was necessary to treat with electricity, but for some time no metal for the current could be found light enough to be borne by the patient. At last the surgeon concluded to

try a spiral of aluminum wire, and the operation was a success.

W. H. Banfield & Co., Toronto, have imported 8 tons of aluminum sheets within a few weeks. The firm manufacture dog tags, systems for ladies' dresses, paper cutters, street numerals, travelers' sample tins, and numerous other articles from aluminum.

The manufacturers of cut nails say that this spring sales have fallen off very perceptibly from last spring's volume. Wire-nail men speak with satisfaction of the season's business so far.

John Inglis & Son, Toronto, are making a large evaporator for the new salt works that are being built at Windsor, Ont. Another contract the same firm have in hand is the making of the boilers for a large vessel that is being built for the North Shore Navigation Company to ply between Owen Sound and Chicago in time for the World's Fair.

The manufacturers of agricultural implements and machinery are consuming more than the average amount of material. The two successive good harvests reaped in Manitoba and the Northwest have given a special impulse to business from those quarters.

The Northey Mfg. Company, Toronto, are putting up a large building in the west end of the city. Their steam pumps and condensers are in wide demand.

The long drawn out strike of Hamilton, Ont., molders appears likely to terminate in an unconditional surrender, as since the International Iron Molders' Union has stopped its remittances the molders are treating more reasonably for resumption of work. They have been on strike 14 months and their play spell has cost the International Union \$30,000.

A syndicate of capitalists is negotiating with the Toronto city council for a lease of an abandoned pumping station, on the site of which it proposes to erect rolling mills. The conditions named have so far been favorably received, and it appears certain that the industry will be established.

Though mining machinery has been three years on the free list, and though another extension of three years has been given to its free admission into the country, yet the condition that privilege is subject to makes it a matter of annoyance to importers. The condition in question is that it shall not be of a kind similar to what is made in the country. The officious officialism of collectors is fully exercised in this matter, and the privilege is often endangered, or enjoyed only after much trouble has been caused.

The Killey-Bee Rett Engine Company, Hamilton, Ont., have sent to British Columbia a 100 horse power engine to be used in a big sealing steamer.

The Eureka Currindrum Company has bought mining rights in the township of Pittsburg, Ont., for twenty-five years, the consideration paid being \$150,000.

The owners of mica property near the city of Kingston, Ont., are turning up some very fine samples. A considerable amount of shipping has been done to United States points and to England.

Captain Jewell, U. S. A., and Lieutenant Richards, retired, superintended the loading at the test of the Lefever Bremner dynamite shells at Onondaga Valley, N. Y., on the afternoon of March 24. The first shot riddled the target at a distance of ½ mile. Four shells were fired. The test is reported to have been a complete success.

THE WEEK.

The irrigation enterprises in the arid district of Arizona comprise a system of canals which will cost \$10,000,000. The main ditch is to be 150 miles long and 112 feet wide at the bottom. The area to be irrigated is about 6,000,000 acres.

Swift's former butcher's shop in Cape Cod has expanded to a business that now exceeds \$90,000,000 per annum.

Three hundred boys from English slums have been sent to farms in Canada.

The East River gas tunnel has penetrated hard rock, encouraging the expectation that compressed air, which has been fatal to laborers in three instances, can be dispensed with.

Far up on the Yucón River, in Alaska, a variety of garden vegetables has been cultivated with success.

That the skilled labor market in England continues in a very unsatisfactory state is proved by the last reports of the labor correspondents of the British Board of Trade, published in the *Board of Trade Journal*. The engineering and building trades are the only ones that show any improvement over the month of January, and that but slight. Of the reports of 23 trades unions rendered, 13 describe trade as "bad," 6 as "moderate," and only four as "good;" facts which prove the continued depression.

A colony of 2000 Waldensians, refugees from Italy, will soon remove to 12,000 acres of land purchased in North Carolina, where there is promise that they will become valuable citizens. Lumber for their dwellings is being prepared.

Grave questions relating to the efficiency of quarantine regulations are raised by the landing at Halifax of emigrants bound to the United States.

The agriculturists in Kansas and Minnesota, who are legislating to prohibit contracts payable in gold, are said to have in view the expulsion of loanable capital from the State. They have yet to learn that experience is a hard teacher.

An investigation of the affairs of the bankrupt Lombard Investment Company of Boston is said to show how a concern enjoying high repute may at the same time be entitled to no higher commendation than that of rare skill in deceiving the stockholders.

Frenchmen want to build a ship canal to the Mediterranean, so that it shall not be necessary to pass through the Straits of Gibraltar.

Honduras is engaged in slaughtering her own citizens as a means of promoting the general welfare. In Southern Brazil the same tactics are adopted. The greater the victories achieved the greater the disaster.

Cholera is quite destructive in several parts of Russia and Austria.

Ice on Lake St. Clair, Mich., is the thickest in 20 years.

Chinamen are entering this country surreptitiously both from Mexico and Canada. The Chinese wall proves to be ineffective.

Prospects are that cholera will soon become epidemic in remoter Europe.

The temperature in Cuba often touched 90° last month.

Refugee negro emigrants, who have been passed along to the next town until they find themselves on the Western frontier, are now planning to go to Brazil to work coffee plantations.

Cotton planting in the South has become quite general, and in Texas the acreage will be increased. The "Lone Star" State may grow one-third of the entire crop.

The Pennsylvania Legislature has appropriated \$825,000 for a fire-proof State Library building.

There is not a wagon factory in all Mexico.

A new labor organization is spoken of, to be composed of members of five organizations of railway employees now in existence. Eugene Debs of Terre Haute, Ind., leads in this new departure and has selected an Executive Committee. One of the prime purposes in view is to abolish strikes and to maintain harmonious relations. The standing Grievance Committees, which Mr. Debs says have been a fruitful source of unrest and discontent in the past, will have no place in the new scheme. There will be no secret sessions and no mystery. Committees will be appointed to consider grievances and report to the Board of Directors. If there is any trouble about wages or any other matters, no effort will be made to adjust it until after the World's Fair.

Samuel Gompers of the American Federation of Labor assures his audiences that at the present rate of organization they will soon be able to cope with trusts and monopolies.

A bitter struggle has arisen in this city between the Clothing Manufacturers' Association and their men who are locked out. The manufacturers comprise 30 of the largest firms, and allege that the men have "combined and conspired together" to boycott their goods, threatening to destroy their trade. Circulars warning merchants throughout the country against handling the goods have been sent out. The manufacturers, through Judge Lawrence of the Supreme Court, caused summonses to be issued restraining the defendants from interfering with business by ordering boycotts or otherwise performing acts damaging to trade. The Federation, it is said, will appeal to the United States Supreme Court.

Crematories for burning garbage have proved so successful in Savannah, Lowell and some other places that Boston and Chicago are considering this mode of disposing of their refuse. The Lowell crematory, which cost only \$10,000, proves adequate to all the demands of the city. In New York the garbage question is as far from a satisfactory solution as ever.

Judge Ricks of Toledo is informed by a man prominent in labor organizations that his decision to the effect that general strikes are "a combination in restraint of trade," has prevented a tie-up throughout the length and breadth of the country.

The hearing in the suit of Cox Bros. & Co. against the Lehigh Valley, charging discrimination in freights, has been postponed again, and some people believe that it will not amount to anything.

Honduras is doing much to encourage Americans in the banana trade, but local revolutions work contrariwise.

California oranges were sold in England in prime condition at \$3.50 a box.

Cheaper silver is making mischief in Cuban trade as well as in Mexico and India.

Herr Krupp, the great gun builder, is said to pay a tax of \$32,400 yearly on an income of \$1,095,000.

Arrangements have been made by the Pennsylvania Railroad for the prompt delivery in New York of perishable freight from Florida and other Southern points within 48 hours after leaving Charleston.

The placing of dynamite in the hold of the British steamer which arrived at British Columbia from San Francisco is an act attributed to the Seaman's Union, and is worthy of those who poisoned the steel workers at Homestead.

Phil. D. Armour, the Chicago meat packer, employs over 16,000 men and boys.

The good will of the New York *Times* is believed to have been sold for \$950,000, and that of the *Mail and Express* for about half that amount.

The ordinances providing for various trolley lines in Philadelphia have all been signed by the mayor and contracts for machinery and materials are already in course of execution.

The Chancellor of New Jersey finds that the Central Railroad has severed its connection with the combine and complied literally with orders for dissolving the lease.

The deal trade of St. John's, New Brunswick, is threatened with extinction by a strike for higher wages by the ship laborers who handle cargoes.

California wheat prospects were never better at this season of the year.

Railroad corporations, not content with monopolizing the lake front at Buffalo and controlling elevators along the entire line of the canal, are now attempting to "freeze out" the canal boats from their old-time rendezvous on the East river in New York.

The Government abandons the proposed Custom House site on Bowling Green, New York was bowled out, as it were.

Already raisin growers in California complain of over-production; wine is sent away in shiploads; oranges are in sharp competition with Florida, and yet the Pacific coast fruit trade has just begun. The great drawback is high freight rates.

Fertilizer and phosphate interests in the South have taken a new start, the product being sold in advance at profitable rates.

A sad tale is furnished by the police record respecting a once prominent iron merchant in John street, New York, who was charged with stealing a loaf of bread.

This time it is a conspiracy in Costa Rica.

An Italian engineer in Milan is making hydrogen at a cost of 1 cent per cubic meter; so it is reported.

There are four steamship lines, comprising 70,000 tons, in the trade between New York and the Mediterranean. Twenty-five years ago America had at least thirty sailing vessels in the trade, all of which have disappeared.

Every day or two during the windy month of March steamships in the Atlantic trade have experienced a broken shaft. The latest misfortune occurred to the Heckla of the Thingvalla line.

Ocean freights in San Francisco are lower than ever before, so that ships are leaving in ballast.

The production of beet sugar in the United States more than doubled during the past year, although there was no increase in the number of factories.

After surveying the crop situation through the entire Northwestern wheat belt, the Minneapolis *Market Record* says: "It does not appear that the winter wheat crop is so much hurt as many would have the country believe."

Boston is worried lest the Boston & Maine Railroad, as well as the New York Northern, fall into the control of the Vanderbilt party and so get cut off from an independent connection both with New York and the West. The question is asked: "Is Boston to be bottled up?"

The Iron Age

New York, Thursday, April 6, 1893.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Consumption of Rails.

The hesitancy which characterizes the steel-rail market is prompting much inquiry into the conditions which have prevailed in previous years. By way of contributing to the store of information which should be in the possession of those interested, we have compiled the following table of the net annual increase in railroad mileage, the total annual domestic production of all kinds of rails, the annual importation of all kinds of rails, and the approximate annual rail consumption, from 1870 to 1892, inclusive :

Years.	Miles of rail-road built.	Production of all kinds of rails. Gross tons.	Annual imports of rails. Gross tons.	Approximate consumption of rails. Gross tons.
1870.....	6,078	553,571	356,387	969,938
1871.....	7,379	692,619	505,538	1,198,157
1872.....	5,878	892,857	473,973	1,366,830
1873.....	4,097	794,711	231,047	1,025,758
1874.....	2,117	651,261	96,706	74,967
1875.....	1,711	707,599	17,364	724,963
1876.....	2,712	785,383	256	785,639
1877.....	2,280	682,776	31	682,807
1878.....	2,679	788,111	9	788,120
1879.....	4,817	993,993	39,417	1,033,410
1880.....	6,712	1,305,212	259,544	1,564,756
1881.....	9,847	1,646,518	344,929	1,991,447
1882.....	11,569	1,507,851	200,113	1,707,964
1883.....	6,743	1,214,905	34,801	1,249,706
1884.....	3,924	1,022,088	2,829	1,024,917
1885.....	2,982	976,978	2,189	979,167
1886.....	8,013	1,600,537	41,588	1,642,125
1887.....	12,878	2,139,640	137,829	2,277,469
1888.....	6,918	1,403,700	56,280	1,459,980
1889.....	5,146	1,522,204	5,551	1,527,755
1890.....	5,498	1,835,307	182	1,835,489
1891.....	4,262	1,307,176	253	1,307,429
1892.....	4,200	1,500,000*	347	1,500,347*

*Estimated.

The period above given comprises what may be considered the era of really great railroad expansion. Up to within a very few years prior to 1870 the progress made in railroad building was astonishingly slow, as compared with the very rapid strides accomplished so easily in the years following. It is, therefore, unnecessary to go further back than these figures except for historical purposes. The growth of the domestic production of rails and the fluctuations in imports are shown in interesting form. The annual consumption of rails, obtained by adding production and imports, is stated to be only approximate, because rails are not always laid as soon as purchased, so that the consumption may really run into another year. There are also some rails exported, which have not been taken into consideration, as the quantities are not large enough to seriously affect grand totals.

In presenting this table attention is particularly called to one point. The figures show very conclusively that the demand for rails is not to be gauged closely by the activity in new railroad construction. A mere cursory examination suffices to demonstrate this. For

instance, in 1890 there were 1500 miles less of new track laid than in 1888, and yet the consumption of rails was larger by nearly 430,000 tons. In 1892 the mileage was some 2700 miles less than in 1888, while the consumption of rails was somewhat greater. New construction in 1892 was about the same as that of 1891, but the consumption of rails in 1892 was some 200,000 tons greater. The prosperity of old roads is evidently more important now than new construction, and probably will continue to be until some wildly speculative era of railroad building again sweeps over the country. There is a disposition to stimulate railroad construction in some sections, which may or may not amount to something of consequence. Bonds are again being voted by towns and counties to secure desired railroad connections. The success of a few schemes of this character may influence others and bring about fresh activity, which would, of course, be welcomed by the rail mills. Meanwhile, however, their best trade will come from old roads laying a second, third or fourth track, or replacing partly worn light sections with heavy rails, or making absolutely necessary renewals.

Competing With England.

Judging from the tone of London papers when remarking upon the change of flag upon two of the Inman International steamers, not a few Englishmen seem to regard the act as almost impertinent, and to attempt in America to build steel vessels to run in competition with British steamers is little short of audacity. The remarks of the London *Economist* on this subject, while betraying a feeling akin to jealousy, are in one sense amusing, at the same time conveying a certain amount of unwelcome truth. The writer speaks of "a new departure in transatlantic navigation," and proceeds to say : "The United States cannot for a moment hope to compete with British-owned and British-manned ships on their merits. It has been proved to the hilt that it is quite impossible for American shipbuilders to produce tonnage as cheaply as English bottoms are manufactured. They require to pay almost twice as much for their principal materials to begin with. Steel plates can be bought for £7 per ton in England, while they cost nearly as much again on the Delaware and the Schuylkill. Not only so, but the cost of the labor employed in an American shipyard is very much greater than the cost of labor in an English factory or workshop of the same character."

It would be vain to deny that Americans, in entering the lists a second time to dispute the maritime supremacy of Great Britain, meet a foe worthy of their steel. The writer above quoted affirms unequivocally that steel plates cost nearly double on the Delaware what they do in England, and asserts with the same confidence that the average wages of American seamen are nearly twice the average earnings of British seamen. Starting from these premises the conclusion is reached that "Americans cannot compete, even under equal conditions." In support of this view reference is made to

the experience of Germany. The North German Lloyd, we are told, should they lose money during the remainder of their fifteen years' contract as fast as they have during the first three years, will have sunk a total of \$10,000,000. The parties concerned not unnaturally wish to be released of their obligations.

Possibly the London paper assumes too much; but in regard to the relative cost of steel plates in America and England the fact must be conceded that the difference at present is about as represented, the quotation being 1.15 cent per pound delivered in the Tyne, Wear or Mersey, as compared with 1.70 in Eastern Pennsylvania. Here is an important factor in any calculation that may be made; but in American eyes it is full of encouragement, because demonstrating the marvelous progress made in steel shipbuilding in the United States within a very brief period and presaging triumphs that cannot be remote. It is the long stride made toward the attainment of a definite end that enables American mechanics at the present date to make engagements which, a few years ago, would have been arrant presumption; and the steps taken are progressive. There will be no cessation of endeavor until American shipyards stand unrivaled. Our London contemporary says, in pursuing his argument, "there is no doubt that the higher range of wages generally paid in the United States conduces to higher efficiency, and in many American industries the output is greater relatively to the number of hands employed than in the same industries as carried on in England. But, although it is possible that the American marine may be fitted with somewhat more effective labor-saving appliances, it would be an error to suppose that this greater effectiveness, if it exists, would be sufficient to compensate for the higher rate of wages."

Here, too, as in the previous quotation, there is a large modicum of truth. Undoubtedly the superior mechanical appliances constantly introduced by American shipbuilders conduce to higher efficiency and yield better results than were ever before realized or even possible. The fact is seen and acknowledged. The most practical and incisive comment on the reluctant confessions and dismal forebodings of the British organ is found in the achievements of the new cruiser "New York," which on the contractor's trial developed as high as 20.38 knots per hour with 126 to 120 revolutions. True enough, the British have done better, their new cruiser "Blenheim" having made 21.6 per hour with 165 revolutions, and the "Blake"—lately the Admiral's ship—has done almost as well. The Yankees, however, are still climbing, and eventually will not be left far behind.

It has been said that this year is one which will develop a good deal of activity in the purchase of rolling stock by the railroads, and that no heavy buying of track material can be expected until next year. Some color to this view is given by the large amount of business recently closed by car builders, and the considerable orders now in the market. A recent issue of the *Railroad Gazette*

records orders for about 20,000 freight cars, of which 10,000 were taken by the Pullman Company for the Reading, while the others are inquiries from a number of Eastern and Western roads, in lots ranging from 500 to 2000 each. This of course means a heavy consumption of iron and steel in different forms.

Gray's Telautograph.

If expert electricians are not wofully mistaken, another very important aid to the facilitation of business has been perfected. Professor Elisha Gray, of Highland Park, Ill., after six years of constant experiments, last week exhibited his apparatus for transmitting by wire a *fac-simile* of anything written or drawn, the apparatus being of such a simple character that a skilled operator is not necessary. It is claimed that every obstacle which has hitherto defeated the attainment of this long-sought process has been surmounted, and that the apparatus is ready for introduction into practical every-day use. It is styled the telautograph. A transmitter and a receiver are used, each somewhat smaller than a type-writing machine. The transmitter and receiver stand side by side. In sending a message an ordinary lead pencil is used, near the point of which two silk cords are fastened at right angles to each other. These cords connect with the instrument, and, following the motion of the pencil, regulate the current impulses which control the receiving pen at a distant station. Ordinary paper five inches wide, arranged on a roll attached to the machine, is used by the writer. The receiving pen is a capillary glass tube placed at the junction of two aluminum arms. This glass pen is supplied with ink, which flows from a reservoir through a small rubber tube placed in one of the arms. The electrical impulses coming over the wire move the pen of the receiver simultaneously with the movements of the pencil in the hand of the sender. As the pen passes over the paper, an ink tracing is left, which is always a *fac-simile* of the sender's motion, whether in the formation of letters, words, figures, signs or sketches. Apparently, the only limit in reproduction is that of stenographic characters, as the machine makes but little distinction between heavy and light lines.

Assuming that the telautograph is now in as good condition for practical use as was the telephone when first brought out, a magnificent range of possibilities is presented. Private wires for the transmission of messages can be furnished business offices as easily as telephonic communication is now established. A business man can receive and transmit his own messages without the intervention of a messenger boy and also without having them pass under the scrutiny of two or more telegraph operators. Further, not only does he secure secrecy, but he also obtains a record in black and white of his telegraphic correspondence, including exact reproductions of the communications sent by the party at the other end of the wire. The telegraph and telephone may not be superseded, as they have their uses; but

the telautograph steps in to occupy a field which neither of them can cover. As the receiver works without any attention, persons having telautograph connections can be furnished with dispatches or messages at any time, day or night, which will be appreciated by those who occupy their offices irregularly.

The *fac-simile* of the original writing of a message which is provided by the telautograph will avoid many disputes and mistakes arising in the transmission of communications by our present system. Even the identity of the writer or sender is thus preserved and can be traced by those familiar with his penmanship. Contracts in much more satisfactory form can be made in this way than by telegraphic message or telephone, and it may not be necessary to add, as now "Please confirm by mail."

Dear Building Material at Chicago.

All classes of building material, except iron and steel, have greatly advanced in price in the vicinity of Chicago on account of the heavy demand created by preparations for the World's Fair. Brick, lime, stone and lumber are all considerably dearer than they were a year since. The most notable rise seems to have taken place in sash and doors and inside trimmings. Discounts on manufacturers' lists which were 65 per cent. last spring are now only 40 per cent., showing an advance of over 70 per cent. on the net price then realized. The World's Fair demand has been a grand harvest for these manufacturers, whose trade had previously suffered most keenly from overproduction. It is now feared that the sudden curtailment of this demand, which will take place in May or very shortly thereafter, will have a disastrous effect. Numerous building projects, however, have been deferred for this very reason, and the building trades of the Northwest may be sufficiently well employed on miscellaneous work during the summer to counteract to a great extent the expected depression following the World's Fair rush.

A Wisconsin Strike Law.

Anti-Pinkerton legislation continues. The following bill passed the Wisconsin Senate on March 31:

The use or employment of bodies of armed men to act as militiamen or peace officers who are not duly authorized or empowered to act in such capacity under the laws of this State is hereby prohibited and declared to be unlawful; and no person, firm, company or corporation shall hereafter use or employ any such body of men to act in the capacity aforesaid for the protection of person or property or for the suppression of strikes within this State, whether such armed men be employees of detective agencies (so-called) or otherwise. Any person who as officer or agent of any firm, incorporated company or corporation aids or assists in the employment of such armed men shall be deemed to have employed the same within the meaning of this act. Any person found guilty of violating the provisions of this act shall be deemed guilty of a felony and shall be punished by a fine not exceeding \$1000 or by imprisonment in the State Prison not more than three years nor less than one year, or by both such fine and imprisonment.

The statement is made that under this bill an employer cannot protect his prop-

erty even with his own employees. The labor leaders are apparently securing just such legislation as they demand. Conditions may be so happy for some time that serious labor troubles will not visit Wisconsin. But it is too much to expect, with the infirmities of human nature governing many manufacturers and labor leaders, that there will always be peace. When a conflict does come, some competent force will be supplied, as in other States, for the protection of property. Despite disabling acts of legislatures, there is always a reserve power in the State itself which forms part of the fundamental principles of government. Otherwise there is no government, but a state of anarchy.

OBITUARY.

FRANCIS WEDGE.

On March 14, Francis Wedge, president of the Griffith & Wedge Company of Zanesville, Ohio, died. Francis Wedge was a native of Fernhill, Staffordshire, England, where he was born January 12, 1825. He learned the trade of machinist with Sir Joseph Whitworth, Manchester, and in 1848 came to America, going first to Zanesville to superintend the placing of machinery in the rolling mill which was then building there. Subsequently he associated himself with John H. Jones in the Blocksom foundry, and afterward became master mechanic of the Blandy shops. In 1858 the firm of Griffith & Wedge was organized, developing gradually a very extensive business in engines, saw mills and mining machinery. When in 1884 Mr. Griffith died, Mr. Wedge purchased his interest and organized the present company, assuming the presidency and carrying on the entire management.

HIRAM BERDAN.

Gen. Hiram Berdan, inventor of the famous Berdan range finder, torpedo and rifle, died suddenly at the Metropolitan Club in Washington on March 31. General Berdan was born at Plymouth, Mich., about 70 years ago. In June, 1861, he was authorized by the War Department to organize the First United States Sharpshooters, known as Berdan's Sharpshooters throughout the war. Starting as Colonel of his regiment, Berdan proved himself a most excellent soldier and officer, and retired from the service in January, 1864. On March 13, 1865, he was breveted Brigadier General of Volunteers for bravery at Chancellorsville, and on the same day was given the rank of Major General of Volunteers for his services at Gettysburg.

General Berdan's best-known invention was the metallic cartridge now in such general use, the reinforcing cup being his particular improvement. Many of his inventions have been incorporated in the Springfield rifle, and a year ago the Court of Claims gave him a judgment for \$100,000 against the Government for infringements. The Berdan rifle has for several years been the arm of the Russian Government, and other European countries have adopted variations of the same model. He also invented a range finder and several torpedoes and torpedo boats designed to evade nets. He also made a distance fuse for a sharpened shell.

Immediately after the war General Berdan worked with the Remingtons, but had difficulties with them, and left to establish the Berdan firearm manufactory.

OTHANIEL PRESTON.

Othaniel Preston died at Hornellsville, N. Y., March 27. He was born in 1832, where the city of Rochester now stands.

He grew up on a farm, gained an education by diligence, and was afterward engaged in a number of mercantile pursuits until his removal from Howard, N. Y., to Hornellsville in 1874, at which time he formed the Hollow Cable Mfg. Company. Great success followed his manufacturing interests.

PERSONAL.

Sir Benjamin Baker, vice president of the British Institute of Civil Engineers, will represent that institution at the Engineering Congress, to be held in Chicago during the week commencing July 1.

Francis T. Peacock has severed his connection with the Covington Machine Company of Covington, Va., to accept the position of engineer for the United States Car Company of Anniston, Ala.

Samuel O. Gleason has been chosen treasurer of the Walter A. Wood Mowing & Reaping Machine Company of Hoosick Falls, N. Y. Soon after the death of Willard Gay, who was treasurer of the company, P. S. Macgowan of Hoosick Falls became the treasurer, but his connection with the Minneapolis Harvester Works, which are an outgrowth of the Hoosick Falls establishment, compelled his resignation from the office of treasurer.

F. T. Aachman, Professor of Chemistry at the Pittsburgh College of Pharmacy, has opened an office and laboratory in the Smertz Building, corner Water and Market streets. Analyses, assays, sampling and reporting on iron ores and product of furnace and mill, and consulting and advice on chemical processes and manufacture will be the work carried on in the new laboratory.

Robert McAfee, for some years general manager of the Lower Mills of the Oliver Iron & Steel Company, Allegheny, Pa., has resigned his position to accept the position of Chief of Public Works at Allegheny. Upon severing his connection with his old firm Mr. McAfee was presented with a gold watch and chain by the men who were formerly under him.

There are six cases growing out of the Ann Arbor strike now in the United States Court. The first is that of the engineers and firemen of the Lake Shore, on the charge of contempt of court. The second is that of the restraining order granted by Judge Ricks at Cleveland early in the struggle, and which prevents the connecting railroads in Toledo from refusing to accept the freight from the Ann Arbor, and is based upon the provisions of the Interstate Commerce law. The third is that granted by Judge Taft at Detroit, restraining Chiefs Arthur and Sargent from issuing or keeping in force any order which they had already issued to employees of any railroads to refuse to accept the business of the Toledo & Ann Arbor Railroad. The fourth injunction was that ordering Chief Arthur and Chairman Watson, of the Lake Shore, to bring into court any order or rule or regulation of the Brotherhood of Locomotive Engineers which was the basis for ordering a strike or a boycott. The fifth is the restraining of about 100 employees of the Wheeling and Lake Erie Railroad from refusing to accept or handle the freight or cars of the Toledo & Ann Arbor Railroad Company. The sixth is the suit for \$300,000 damages, filed by Manager H. W. Ashley of the Ann Arbor road, against Chiefs Arthur and Sargent, based on the strike and the refusal to transfer freight to connecting lines.

An order for 400 electric motors for the Atlantic Avenue Railroad, in Brooklyn, amounts to \$1,000,000.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., April 5, 1893.

Chairman Springer, who has been in frequent conference with Secretary Carlisle on the subject of his new tariff bill, said to-day that he has the measure in such shape that if the President should call an extra session on May 1 he would be ready to submit it as soon as the Committee on Ways and Means was appointed. The talk about Mr. Springer and Mr. Holman being removed from the chairmanships of Ways and Means and Appropriations, and of certain demands made by the President to govern the action of Speaker Crisp as the price of his reelection, is simply the utterances of un-informed or irresponsible persons writing from Washington. Mr. Crisp will be re-elected Speaker, and both the gentlemen above named will be at the head of their old committees. Mr. Springer was severely criticised by certain tariff reformers of the Mills' school for adopting the tentative plan, instead of formulating a general tariff revision bill. Mr. Springer said to the correspondent of *The Iron Age*: "My chief reason for adopting the course was that it would be useless to attempt to bring forward a general measure, as it would be impossible to get it advanced beyond the House. Many of the tentative bills were passed by large majorities, they receiving the solid Democratic vote, North, South, East and West."

All the articles in these tentative bills have been incorporated in the bill now being prepared, which, having been considered and passed upon, will not be likely to take up any considerable time in the discussions of the new measure. Although there was considerable opposition to Chairman Springer's plan of operations, it was approved by David A. Wells and others of his school, who held that it was the most feasible method of reaching results. The increased free list in the Springer bill includes wool, lumber, salt, binding twine, coal, iron ore, and all other raw material entering into the more advanced stages of manufacture.

There will be a large reduction in manufactures of woollens and cottons. The Democratic idea which the President approves relates more particularly to free raw materials. He regards this as one of the progressive stages in the ultimate reform of the tariff on the scale of lower duties. This being the Administration idea, the bill follows that line and will receive the prompt and cordial indorsement of the President.

The new bill scales down the duties on all manufactured articles.

The metal schedule will have some radical modifications. There will be a reduction along the entire line, including steel rails, pig and structural iron, blooms, castings and all other branches, with cotton ties on the free list. The tin plate provisions in the McKinley bill Mr. Springer says have not accomplished what was expected by those who framed them. He asserts that after an experience of two years the domestic manufacture is so small that it does not supply a material portion of the American demand. The amount of tin plate consumed when the present law went into operation he claims was 650,000,000 pounds. After the exhaustion of the overstocked market and after trade had returned to its ordinary channels the imports of foreign tin plate enormously increased. The chairman says that the uses of this article have so greatly increased in manufacture of canned goods of all descriptions in the United States that the output of the home plants will be entirely inadequate. It is estimated that the amount of imported tin in the next

year will reach 800,000,000 pounds, instead of 650,000,000 pounds when the McKinley bill went into operation.

It is proposed to incorporate some legislation which will be fair to the tinning industries and will modify the McKinley five years' provision. If the McKinley bill is repealed as a whole, which is the object of Mr. Springer and his party, it is believed that these tin plate provisions will go with it.

This bill will be in readiness to be submitted as soon as the Fifty third Congress is organized and the Ways and Means Committee appointed.

Iron in Colombia.

A British consular report recently referred to the iron works which are being carried on in the neighborhood of Bogota, Colombia. The Praderas Iron Works, belonging to the Variga family, situated on the plains about 40 miles east of Bogota, are said to have been working for about 12 years. These works now produce daily some 70 tons of pig iron, which is converted into all kinds of cutlery and hardware. It is said that even small locomotives are manufactured at this establishment. The works at Pacho, situated about 45 miles to the northwest of Bogota, were originally founded by Robert Bunch some 50 years ago, and produced a good class of iron and rails of light weight. The ore, brought from a short distance, appears of good quality, and fuel is abundant. These works are now closed, as the Pradera Works, possessing better facilities of communication, can produce as good an article at a lower cost. There are also some works erected at Samaca; these also are no longer working. The ore proved of excellent quality, but the quantity was so small as not to be able to be worked profitably. The Government of Boyaca has spent \$432,000 on the foundry and buildings and the development of the mine.

It is reported that the first convention of the Finishers' Union of Iron & Steel Workers will be held in Youngstown, Ohio, early in June. As yet nothing has been done looking to the wage scale which will be presented to the manufacturers governing wages for the year commencing July 1, 1893. It is the impression in some quarters that a truce will be patched up between this organization and the Amalgamated Association of Iron & Steel Workers, and if this occurs, a consolidation of the two bodies will probably take place.

Judge Billings of New Orleans has rendered an opinion that the cars of the Pullman Palace Car Company are assessable. The property of the company cannot, however, be taxed as permanent property.

Proofs of the increasingly depressed condition of the English iron trade continue to appear in the London papers. *Iron* says that a committee of three ironmasters and three mine owners has been appointed by the ironmasters and iron-ore proprietors of West Cumberland to negotiate with the royalty-owners with a view to a reduction of the royalty rents. Of the 38 furnaces in the district 12 only are in blast, while three out of five large steel works are idle. The introduction of the basic process in the making of steel is said to be the cause of the paralysis, and it is the unanimous opinion of the smelters and mine owners that a substantial reduction of royalties is absolutely necessary to save the trade of West Cumberland from destruction.

The Brazilian Government is reported to have let a contract for 70,000 rifles to a Berlin (Germany) firm.

Trade Publications.

WE HAVE RECEIVED two catalogues from Edwin Harrington, Son & Co. of Fifteenth street and Pennsylvania avenue, Philadelphia, Pa. One describes their hoists, overhead railway and traveling cranes, from 500 to 20,000 pounds capacity, and gives everything necessary for the complete equipment of a plant. Concerning the overhead tramway it is stated that "by the use of this system in our shops we are prepared to show an actual saving of 50 per cent. in the cost of labor while handling large or heavy articles, in addition to the fact that it lessens very materially the liability to accident, and it is our experience and opinion that every machine shop, factory, warehouse, &c., should be equipped with this system. With our railway, hoist and geared track two men are enabled to handle a large casting much easier than six men the old way. Another important feature is that goods can be transported about a room by raising them to clear work that may be in the path or on the floor."

The second catalogue deals with machine tools built by the company, including lathes, drill presses, planers and special machine tools. The engine lathes have large diameters of cone, with broad belt surface; hammered crucible steel spindles; bronze metal journal bearings; lead screw for screw cutting, carriage screw, tail stock, spindle screw, back shaft studs for feed works and feed rack, all of steel. Tail stock spindles clamped by adjustable conical binder; stationary or steady rests on all sizes; following rests on all sizes below 38 inches swing. All sizes have power cross feed, compound tool rest, gibbed carriage unless otherwise ordered. Twenty-inch swing and larger have extra side block for turning full swing of lathe. Thirty-two inch swing and larger have geared-face plates. Sixteen to 32 inches inclusive have two face plates. Thirty-six inch swing and larger have plates keyed to spindle unless otherwise ordered. Carriages have long arms, giving greater bearing surface, which are self-oiling, lessening the liability to cut the guides when constantly on short work. All sizes have improved geared friction feed, unless ordered for belt, so arranged that screw cutting cannot be engaged at same time as friction or turning feed. Three section cone feed gear, on end of head stock, connecting with lead screw gives a positive feed and enables a change more quickly than a belt. All the lathes have cut gearing. All centers are fitted with Morse twist drills, standard taper. The lead screws are cut from a master screw direct from the Whitworth standard, and carefully kept for proving the working screw of the screw threading lathe, and secures accuracy of screw cutting on all lathes built by them.

A. ALLER of 109 Liberty street, New York, has issued a catalogue of engineering specialties for steam, oil, gas, water and chemicals. The high efficiency and reliability of these appliances are shown by the constant and ever increasing demand for them. The following is a partial list of the machines described in the catalogue, all of which are shown in actual operation at the warerooms of Mr. Aller: Korting injectors, water and steam pressure regulators, lubricators, pumps, blowers, &c.

SCHAFER & BUDENBERG of Brooklyn, N. Y., have arranged with Professor Carpenter of Cornell University for the sole manufacture and sale of calorimeters invented and patented by him. The throttling calorimeter proper is made of brass, nickel-plated, and consists of a small vessel to which steam is supplied through a tapering or converging orifice, and which contains in its center a very deep cup, into which a thermometer can be inserted for obtaining the temperature of the steam in the calorimeter; the calorimeter is furnished with a cock, to which a manometer can be attached for measuring the pressure in the interior. The exhaust steam is discharged from the lower part of the calorimeter, and need not be condensed; it may be conducted away in a hose or pipe, or permitted to escape into the air, as convenient.

The principle on which the calorimeter operates is as follows: Some of the heat contained in high pressure steam is liberated when the pressure is lowered, and that heat is utilized in evaporating any water the steam may contain and in raising the temperature of the steam above that due to its pressure. Thus the total heat in 1 pound of steam at 80 pounds absolute pressure is 1177 B. T. U., and that in 1 pound at 20 pounds absolute pressure is 1151 B. T. U. If, now, steam were allowed to expand, without doing work on any body except itself, from 80 to 20 pounds pressure, 26

B. T. U. would be liberated for each pound of steam. Since at 20 pounds pressure 954 B. T. U. are required to evaporate 1 pound of water, we should have additional heat sufficient to evaporate $26 \div 954$, or 0.027 pounds. Now, if the original steam contained less than 2.7 per cent. of moisture, a thermometer placed in the steam would show a temperature higher than that due to a pressure of 20 pounds, which is 228° F. In such a case, it would be possible to compute the percentage of moisture in the steam; but if the steam contained more than the above moisture, the heat would not be sufficient to evaporate it, the reading of the thermometer would be equal to that of the boiling point for the given temperature, and no computation of the moisture in the steam would be possible. That is, a throttling calorimeter cannot be used if the steam contains much over 2.5 per cent. of moisture, but it is very convenient and accurate when it can be operated.

The separating calorimeter consists of a vessel about 12 x 3 inches, constructed so that steam in passing will be completely and perfectly separated from any moisture that it contains. The moisture is precipitated in an interior chamber, which is connected to a water gauge glass and scale, so that the amount of water can be seen and its volume of weight read off on a scale. The dry steam passes into an external chamber, which surrounds the inner chamber and forms a steam jacket, which prevents the loss of heat by radiation from the inner chamber. The dry steam and such water as may be formed in it by condensation after leaving the calorimeter is discharged at the bottom of the outer chamber through a small orifice. This steam is caught in a condensing vessel and its weight determined from the increase in volume of the original water in the condensing vessel. The scale on the calorimeter gives the weight of moisture, that on the condensing vessel the weight of dry steam.

The per cent. of moisture in the whole weight is then, evidently, the quotient obtained by dividing the weight of steam, as shown by the calorimeter scale, by the sum of that shown by the scales on the calorimeter and the condensing vessel. The quality of the steam is 1 minus this number.

The Hartford Steam Boiler Inspection and Insurance Company endeavor annually to collect statistics of the number of boiler explosions occurring from year to year and figures relating to the mortality and injuries thus caused. Although confessedly incomplete, the total figures are startling, indeed. For the year 1892, 269 boiler explosions have been recorded, against 257 for 1891 and 226 for 1890. Where more than one boiler exploded at the same time, each boiler has been counted separately, in the belief that a fairer idea of the amount of damage done could be arrived at in this manner. The explosions are classified and are arranged by months. A somewhat curious fact is brought out in the table so far as it relates to rolling mills and iron works. In all there were 24 explosions, of which 7 occurred in January, 1 in February, 3 in March, none in April, May, June, July and August; 2 in September, 3 in October, 1 in November and 7 in December; so that apparently the winter months are most fatal to this class of structures in iron manufacturing plants. The total number of deaths resulting from boiler explosions was 298, while there were injured 442 persons.

Samuel J. Hoggson of New Haven, Ct., president of the Hoggson & Pettis Mfg. Company, is the inventor of a substance which he has entitled "Colophite." It is stated that he has sold his invention to a company of capitalists who will constitute the parent company. It is expected that the business of this company will be confined to the manufacture of "Colophite" in its various forms and the preparation of Kauri and other gums for the supply of sub-companies which will be formed to introduce and develop the sale of these products in the different branches of trade. This parent company will become a stockholder in each sub-company formed, thereby securing to itself a source of revenue in addition to the profits to be

made by sales of its own products. The following-mentioned branches will require the formation of sub-companies: For manufacturing anti-crustaceous compound, for manufacturing piano and organ key-boards, &c.; for manufacturing paints, enamels, kalsomine, &c.; for manufacturing wood pulp and paper wares, for manufacturing waterproof paper, &c.; for selling anti-rust and oxidation solution, for selling anti-boiler-scale compound, for selling prepared gum to varnish makers and many other industries.

MANUFACTURING.

Iron and Steel.

Bellefonte Furnace of the Bellefonte Furnace Company of Bellefonte, Pa., which has been idle for some time, will probably resume operations in the near future. It is stated that Thos. A. Shoemaker, formerly connected with the Bellefonte Central Railroad Company, will be superintendent of the plant.

The Tyler Tube & Pipe Company, Washington, Pa., manufacturers of charcoal iron and special steel boiler tubes, will soon award contracts for additional buildings and machinery, with the object of doubling their present capacity.

In all probability the consolidation of the interests of the *Ætna Iron & Steel Company* and the *Standard Iron Company*, both of Bridgeport, Ohio, to which reference has already been made in these columns, will be consummated at an early date. A charter has been granted to the new concern under the name of *The Ætna-Standard Iron & Steel Company*, and a meeting of the stockholders of both concerns will be held in Wheeling, W. Va., on the 27th inst. As yet no opposition has been manifested by the stockholders, and all indications point to the consolidation being consummated on the above date.

It is stated that in all probability the furnace of the *Franklin Iron Works*, in Oneida County, N. Y., will never be operated again. The company's store will soon be closed. Many of the furnace employees have moved away, and before long the village of *Franklin Iron Works*, whose inhabitants depend solely upon the furnace for a livelihood, will be deserted.

The *Colorado Fuel & Iron Company's* new plant at Denver, Colo., will be a very large and complete one. E. C. Potter of Chicago is the engineer in charge of the planning of the same, and he is securing only the latest and most approved machinery. In the foundry it was his intention at first to use only electric cranes, but having seen the *Steam Hydraulic* in use in the foundry of *Fraser & Chalmers*, at Chicago, decided to use the *Ridgway Crane*.

The *Bellaire Nail Works*, of Bellaire, Ohio, are changing over the old nail-plate mill at this plant to roll steel skelp. The mill adjoins the blooming mill, and the red hot billets will be handled directly from the shears into the furnaces. The mill will be equipped with the best appliances for handling the product quickly and all the cranes will be *Ridgway Steam Hydraulics*. As the finished skelp leaves the shears a *Ridgway Crane* will take it and both weigh and load it.

The *Harrisburg Rolling Mill Company* are changing their large grooved skelp train to make 30 inch skelp. This will increase the output of this mill to 200 tons per day. This whole output will all be weighed and loaded by a single quick acting *Ridgway Steam Hydraulic Crane*.

The *Norristown Steel Company* of Norristown, Pa., have published an official circular, in which they announce that in consequence of financial embarrassment caused by a heavy strain on their resources for some time back in making important extensions to their works, and because of the present depreciation in the market, as well as their inability to collect promptly their outstanding accounts, the company have passed into the hands of receivers. The receivers appointed were N. H. Larzelere and H. H. Haines, who have entered the required security. The circular further states that the court took this action to avoid undue sacrifice of the company's assets, and to insure the most equitable and favorable distribution of the same, in the interests of all who are beneficially entitled. It states that the works are well equipped, and in the best condition, and will be continued in operation right along. All orders now on hand, as well also as those now coming in daily, will be attended to with promptness and care, and it is expected that the affairs of the company will quite soon be

brought back again to a strong financial condition.

The blast furnace of the North Carolina Steel & Iron Company, at Greensboro, N. C., recently completed, has never been operated owing to lack of capital. The stack is 70 x 14 feet, equipped with two Ford and Moncur stoves. Valuable mineral property is said to be owned by the company.

Valentine Furnace, at Bellefonte, Pa., which blew out for re-lining and repairs on February 12, has completed alterations and resumed operations March 29.

Chester Furnace at Thurlow, Pa., blew in March 27. The former blast ended in September last.

At a meeting of the stockholders of the Pittsburgh Metallurgy Company held in the Times Building, Pittsburgh, last week, the following directors were elected: J. W. Friend, J. H. Gloninger, Jno. A. Elliott, M. A. Green and M. V. Smith. This concern have decided to change their title, and during this month application will be made for a charter for an intended corporation to be known as the Fuel Gas Engineering Company, which will succeed to the business and interests of the Pittsburgh Metallurgy Company.

We have already referred to the fact that the Tyler Tube & Pipe Company, Washington, Pa., had decided to double the present capacity of their plant. With this object in view, the concern have closed a contract with the Indiana Bridge Company for the erection of a new building of 80 feet span, to be constructed entirely of iron and finished within 60 days. The contract for a large regenerating welding furnace, and for another bending furnace has been let to the S. R. Smythe Company, Incorporated, engineers and contractors of Pittsburgh. The welding furnace will be 28 feet long, and will be equipped with the latest improved machinery. The Babcock & Wilcox Boiler Company have been awarded a contract for an additional 250-horse-power boiler plant. Work on these additions and improvements will be commenced at once and pushed rapidly to completion. The Tyler Tube & Pipe Company was originally located in Boston, Mass., but about three years ago was removed to Washington, Pa., and the company was reorganized with a capital stock of \$200,000, \$50,000 of which was subscribed by citizens of Washington, Pa. The concerns are manufacturers of charcoal iron and special steel boiler tubes and charcoal iron blooms.

Work of remodeling the old Malleable Iron Works at Youngstown, Ohio, will be commenced shortly, preparatory to the starting of a tin plant by a company known as the Youngstown Tin Plate Company. The machinery for the plant has all been bought, and is now ready for shipment. The proprietors expect to put the plant in operation in about a month. Two Morewood machines will be placed in position and worked night and day; they will have a capacity of 35 boxes of bright tin and eight boxes ofterne plate every 24 hours. The men who have interested themselves in this enterprise have worked in tin mills on both sides of the Atlantic. The officers are: Samuel Thomas, president; David T. Edwards, secretary and treasurer; Joseph Chapman, superintendent. Mr. Chapman arrived in this city this week from Philadelphia, where for the past year he had charge of the extensive plant of Merchant & Co. A majority of the stockholders have been in the employ of the N. & G. Taylor Company, also of Philadelphia.

The new sheet and tin mill of the Falcon Company, at Niles, Ohio, is being hurried to completion. The machinery of one of the sheet mills is being run to "limber" it up, and the intention is to commence rolling iron full turn Monday. A large force of men is at work, but it is not expected to have the tin mill ready for operation in less than two months. The plant is said to represent an outlay of \$500,000, and will give employment to 350 persons. It is so planned that if the tariff on tin plate is disturbed so that American manufacture is made unprofitable, most of the plant can be operated as a sheet mill. It is equipped to roll the widest sheet of any mill in the country—55 to 60 inches across.

The Oliver & Roberts Wire Company, of Pittsburgh, made an excellent showing in March. During that month, the rod mill produced 54,333 net tons of wire rods, the wire mill, 6444 net tons of wire and the nail factory 50,347 kegs of wire nails.

The managers of the New Castle Tin Mill of New Castle, Pa., have just ordered an improved automatic pickling machine. This machine is manufactured in England. The engines and other machinery for the new plant are arriving every day and the mechanics are placing them in position. The managers of the mill confidently assert that tin will be made in New Castle by June 1.

The best run of iron made by the Ohio Iron & Steel Company, Louisville, Ohio, since it was started, was turned out Thursday. For the 24 hours preceding Thursday morning 177½ tons of No. 1 iron was turned out.

The nail factory of the Mahoning Valley Iron Company, of Youngstown, Ohio, will resume work on Monday.

No. 2 Longdale Furnace, at Longdale, Va., was out of blast three weeks during March to make repairs. Both stacks are now in blast.

Machinery.

The Enterprise Boiler Company, Youngstown, Ohio, are furnishing the iron work for the four fire-brick stoves of the Massick and Crooke design, now being erected at the plant of the Rosena Furnace Company at New Castle, Pa., by McClure, Amsler & Co. of Pittsburgh. The Enterprise Boiler Company are running their works full time and have considerable work on hand.

The Danville Foundry & Machine Company of Danville, Ill., have been so pushed with orders that they have found it necessary to enlarge their foundry. The buildings, which are low, will be raised and the foundry will be equipped with Ridgway Steam Hydraulic Cranes, orders for which have been placed.

The McShane Bell Foundry Company of Baltimore will soon break ground for a new plant in Linden Township, near Rahway, N. J.

Charles Duisdieker will erect a foundry and machine shop at Pekin, Ill.

The Gillette-Herzog Company of Minneapolis, Minn., have decided to erect a foundry building as a part of their plant. The cost will be \$25,000.

The Crane & Breed Mfg. Company of Cincinnati, Ohio, are enlarging the capacity of their large foundry. Among the new machinery contracted for is a 15-ton Bidgway Steam Hydraulic Crane.

Hemmingway Brothers, of Lynn, Mass., have leased a building at Johnstown, N. Y., and will soon open a machine shop at that place.

J. Sliptoe & Co., 177, 179 and 181 East Pearl street, Cincinnati, Ohio, have again been compelled to move in order to secure greater and more acceptable quarters for the production of their specialty, crank and geared shapers. They have succeeded in doing by securing the premises at 57, 59 and 61 Elm street of the same city, and which they have fitted up with the most modern tools and machines necessary.

The compress polishing wheel has passed into the hands of new owners, who have organized the Compress Wheel Company and are manufacturing it at 149 and 151 Huron street, Chicago. C. H. Wilmerding is president, F. Cramer is vice-president and treasurer and E. W. Cramer is secretary.

The Wells Machine Works of Fostoria, Ohio, needing more room and capital for the manufacture of their pipe threading machines, consolidated with the Merrill Mfg. Company of Toledo, Ohio, and moved their plant to the spacious shops of the latter company. The Merrill Mfg. Company are putting in extensive new machinery, have doubled their force and are now working day and night in their efforts to fill their orders. Mr. Wells has personal supervision of their manufacturing department. The first hand-pipe threading machine manufactured by Mr. Wells was patented in 1887, the title to which is now in litigation in the United States Court of Appeals. This machine, however, has not been offered on the market for over a year, it being supplanted by later productions. Two large-sized machines will be added to their line early in April.

The Totten & Hogg Iron & Steel Foundry Company, closed a contract last week with the Wright Shovel Company of Anderson, Ind., for a complete sheet train.

The machine shops of the Penokee and Gogebic Consolidated Mines at Ironwood, Mich., have been burned. Valuable patterns of mine equipment and machinery were destroyed. The loss is \$14,000.

The Builders Iron Foundry of Providence, R. I., have shipped to Chicago a 36-inch venturi meter manufactured under the patents of Clemens Herchel, C. E., New York city. This meter will be placed in the extreme southeast corner of the grounds and will measure the entire water supply of the Columbian Exposition (about 24,000,000 gallons a day). The recording apparatus will be exhibited in the adjacent building of the Sewage Cleansing Works.

The Ball Engine Company, Erie, Pa., manufacturers of automatic cut-off engines, have recently built a cross-compound condensing heavy duty engine, which will be on exhibition at the World's Fair. The engine has an

18-inch high-pressure cylinder, 36-inch low-pressure cylinder, 18-inch stroke, 225 revolutions and is rated at 500 horse-power. It will furnish power for 2 Edison 175 kilowatts generators, which are to furnish current for one of the two electric fountains. This engine will be placed in the main-power plant, which will contain 43 engines, built by prominent manufacturers all over the country. The engine will be painted pure white with the lettering of gold, in the same manner as all the other engines in the main-power plant at the exhibition. The engine is a very handsome one and will no doubt attract considerable attention.

The Morrison Foundry and Machine Works of Youngstown, Ohio, are very busy at present, having all they can do in light iron castings. The outlook is that the thriving concern will have a steady run throughout the summer.

The Youngstown Brass Works of Youngstown, Ohio, are running full, and this week have been working upon a large order for brasses from the Cleveland Rolling Mill.

Notices have been posted in the shops of the Westinghouse Air Brake Company, at Wilmerding, Pa., notifying certain employees of a reduction in wages varying from 10 to 50 per cent.

Wm. Tod & Co., Youngstown, Ohio, have received an order from the Durango Steel & Iron Company of Durango, Mexico, with offices at Des Moines, Iowa, for a blowing engine. The size of the engine is 38 x 43 inch steam cylinder and 84 x 48-inch air cylinder. The same firm have recently received an order for a Porter-Hamilton engine 18 x 24 inches in size, to be furnished to the Homestead Works.

The Minnesota Iron Company of St. Paul have placed an order with the Lake Shore Iron Works of Marquette, Mich., for 2 ore crushers which will weigh 65 tons each, and will have an opening 30 x 30 inches.

Miscellaneous.

The Natural Gas Company of West Virginia have declared a quarterly dividend of 1½ per cent., payable April 6.

It is stated that a movement is on foot to erect a plant at Latrobe, Pa., for the manufacture of fuel and illuminating gas. It is proposed to furnish gas by a process covered by patents granted to Melvin D. Compton.

The Standard Underground Cable Company of Pittsburgh have declared a quarterly dividend of 1½ per cent., payable on April 10.

The new plant being erected at Chillicothe by Sears & Nichols is nearing completion, and when finished will be one of the best appointed in the West. The best labor-saving machinery only is being put in. The cranes will be the Ridgway steam hydraulic, the order for which has been placed with the Messrs. Ridgway.

The Pittsburgh & Lake Erie Railroad Company have commenced the erection of new repair shops at Riverton station, McKeesport, Pa.

The lower floor of the Lawton Building on Prince street, Kingston, N. Y., is being prepared as rapidly as possible for the occupancy of the United Columbian Electric Company, electrical apparatus manufacturers, who are anxious to begin work at as early a date as possible. A 45 horse-power engine, built by Skinner & Arnold of Albany, N. Y., is being put in and workmen are placing the shafting.

The Gowanda Agricultural Works, of Gowanda, N. Y., have decided to remove the plant to Tonawanda, N. Y.

Among recently authorized corporations in Illinois are the following: The American Car & Railway Construction Company, at Chicago; capital stock, \$1,200,000; for the manufacture of motors and locomotive engines, rolling stock appliances, and supplies for railways; incorporators, Watson Franter, William A. Conover and J. G. Wolfe. The Robnett Hydraulic Motor Company, at Chicago; capital stock, \$100,000; for the manufacture of hydraulic motors; incorporators, W. H. Robnett, C. W. Selfedge and George A. Masters. Triumph Boiler Cleaner Company, at Chicago; capital stock, \$30,000; for the manufacture of machinery; incorporators, Olin H. Johnson, George G. Williams and Fred S. Benjamin. The Champion Self-Heating Sad-Iron Company, at Chicago; capital stock, \$25,000; manufacture and sell sad irons; incorporators, Theodore Steuger, Thomas F. Powers and Harry F. Farnsworth. The Automatic Furnace Company, Chicago; capital stock, \$50,000; incorporators, Charles F. Haines, C. S. Wallis and Charles M. Weaver. The American Smoke Preventer Company, Chicago; capital stock, \$100,000; incorporators, William R. Mills, Charles Smith and Charles A. Pratt. American Steam Boiler Compound Company, Chicago; capital stock, \$100,000; incorporators, William E. Deuer, William I. Cronin, Charles P. E. Dumas, Charles E. Coogan and James Young.

TRADE REPORT.

From all accounts, the Ore situation in Cleveland has not materially changed. The largest interests have not yet covered, and the general fact remains true that the position of the Ore mines is stronger than it was expected to be earlier in the season. The demand for Bessemer Ore promises to be heavy, and it looks as though it would tax the supply with the heavy tonnage of Soft Steel called for by the rolling mills. Had this been a year of large sales of Rails there would unquestionably have been something approaching a famine.

The conviction is gaining ground that an effort on the part of large Ore buyers is being made to counteract the effect of the rise in Bessemer Pig on the attitude of Ore sellers, by putting pressure on the market for the metal. It is hinted that repairs of works have been undertaken earlier than there was any urgent necessity for, so as to restrict consumption and put on the market supplies already contracted for.

It is certain that Bessemer Pig is easier in the Pittsburgh market, although the reservation is made that when the partly artificial pressure is removed values may quickly recover.

The circumstances which appear to militate against Bessemer Pig are aiding Soft Steel Billets. Buyers are turning Eastward, however, in order to avoid the Pittsburgh market. Thus negotiations are said to be under way at tidewater for the Chicago district, and an Eastern Pennsylvania mill usually buying in the West is also inquiring in the Eastern markets. Some signs of weakness are appearing in the territory lying between Chicago and Pittsburgh, where a new comer has been taking business usually controlled by rival mills.

While the temporary halt seems to be favoring buyers, it is stated as an argument on the other side that the requirements for April and May Soft Steel are not yet fully covered.

In Foundry Irons there has been little change lately. Our Cincinnati correspondent notes a sale of No. 2, on the basis of \$3 75, for delivery during the balance of the year, and in other quarters facts appear to show that Southern producers, both in Alabama and in Virginia, keep crowding the market.

There has been very little change along the whole line of Manufactured Iron and Steel. Philadelphia records a little better feeling in Bars and Skelp, and Pittsburgh notes an attempt to get better prices for Soft Steel Bars. Plates still show evidences of distress, and Sheets in Philadelphia are selling at very low prices.

Reports are conflicting concerning the state of the Structural market. In some quarters spring contracts are lingering. An interesting item is the approaching letting of a contract for 17,000 tons for the Park avenue elevated improvement in New York, which is looked upon as being likely to fill some hungry mills at least for a time.

Tin seems to be becoming a more and more unmanageable load for the boomers who have discounted the coming duty on that metal. Copper is dragging along quietly. Lead has stiffened after good purchases by large consumers. There is only moderate activity in Tin Plates.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., April 4, 1893.

The commencement of the fourth month in the year does not bring with it any new or encouraging features. The volume of business is large, and prices are steady, but they are so low that manufacturers insist that they are working on so small a margin that it precludes the idea of doing more than getting out whole. Further weakness, therefore, is something they dread to meet, and yet it is not entirely certain that this can be avoided. As already stated, there is no reason to complain of business being dull; the point is, that it is unprofitable, and it is not clear how it can be made otherwise, unless there is some very decided change in the conditions, of which there is no immediate probability. Supply and demand are very evenly balanced; the weak point is, that the facilities for production are growing all the time, so that, heavy as the demand is, and heavy as it may be, the impression prevails that it can be easily met, hence there is no inducement for speculative buying. Many large producers are also of opinion that there is no good reason for refusing any business that can be had at about the figures now ruling, which appears to be confirmed by the ease with which orders are placed for material of almost any description. Apart from the matter of prices there is no room for complaint, and it may be that even in that respect the situation is not as bad as it is made out to be. This article simply aims to voice what the trade have to say, which, in regard to prices, is singularly in accord.

Pig Iron.—The demand is much of the same character as noted for several weeks past, fairly active for standard brands, a little slow for other descriptions. There is no particular pressure to realize, however, so that in ordinary cases sales are at unchanged prices. At a reduction of a few cents per ton, sales could easily be increased, while a few cents advance just as effectually checks the demand, so that the market may be said to be about on an even keel. Consumption is nearly up to its maximum, and while there may be some further increase during the next 60 days, the chances are equally strong that the supply will keep pace, particularly if there is any stiffening in prices. Taking everything into consideration, therefore, there does not appear to be much chance for higher prices, while at the figures now ruling it seems equally improbable that there can be any appreciable decline, and, as a matter of fact, the trade are so much in accord on this point that it is impossible to get up anything like a scare. Buyers feel that they can get all the Iron they are likely to need at current prices, while sellers are equally sure that concessions are uncalled for, unless for an off grade, for spot cash or for some reason peculiar to that particular transaction. For the present, therefore, sales are about on a par with the supply, and prices are steadily held as follows for Philadelphia and equivalent deliveries, with 25¢ @ 50¢ less on Southern brands at Harrisburg and intermediately to Baltimore:

American Scotch, No. 1X.....	\$16.00 @	\$16.50
American Scotch, No. 2X.....	15.00 @	15.50
Standard Penna. (Lake Ore), No. 1X.....	14.75 @	15.00
Standard Penna. (Lake Ore), No. 2X.....	14.00 @	14.25
Standard Virginia, No. 1X.....	14.50 @	14.75
Standard Virginia, No. 2X.....	13.75 @	14.00
Virginia and Southern, No. 1X.....	14.00 @	14.50
Virginia and Southern, No. 2X.....	13.25 @	13.50
Standard Penna. and Virginia Forge.....	13.00 @	13.25
Ordinary Forge.....	12.50 @	12.75

Freights.

Alabama Furnaces, Rail to Philadelphia.....	\$4.31 @	.....
Alabama Furnaces, Rail and Water to Philadelphia.....	4.01 @	.....
Alabama Furnaces, Rail to Baltimore and Harrisburg.....	4.08 @	.....
Virginia Furnaces, Rail to Philadelphia.....	2.25 @	\$2.75
Virginia Furnaces, Rail to Harrisburg.....	1.50 @	2.00
Virginia Furnaces, Rail to Baltimore.....	1.75 @	2.25

Steel Stock.—There is a trifle better demand for Cornwall Bessemer, as well as for Standard Bessemer, but there is no change in prices, which are about as follows: Bessemer, \$15.25 @ \$15.50, delivered; Standard Bessemer, \$16 @ \$16.25, and Low Phosphorus, \$17.50 @ \$17.75.

Steel Billets.—The market is not as firm as might be supposed from some of the reports that are floating around. Mills in Pittsburgh and Wheeling claim to be full up to midsummer, but it is noticed that bids of \$25 @ \$25.25 for any of the intervening months are not long waiting for acceptance. Of course it is too soon to predict that the flurry is over, but in the meanwhile consumers are not in any hurry to place orders at to day's figures, but from the way quotations are given it looks as though makers are disposed to sell liberally at prices around \$25, for Schuylkill Valley or equivalent points. Consumption is very large, however, and from present appearances mills will have all the business they can handle for some time to come, although for late deliveries prices are inclined to weaken.

Steel Rails.—Business is not specially active at present, although there is so much special work of various kinds that mills are not suffering for want of Rail orders. Prices are unchanged at \$29, f.o.b. cars mills, and for Street Rails, which are in good demand, \$32 @ \$36 is quoted.

Muck Bars.—Market extremely dull, with somewhat liberal offerings at \$22.50 @ \$22.75, f.o.b. cars sellers' mills. There is little or no inquiry, and bids for round lots are hard to find.

Bars.—Manufacturers report a better demand with some slight indications of better prices. Mills are getting to be well supplied with orders, and the average of sales for the week would probably show 50¢ ¢ ton advance. Sellers are quoting a little higher yet, but the advance so far has been of a negative character, viz., in the refusal of such concessions as were granted in recent transactions. On top of this, manufacturers ask 2½¢ per 100 lb additional, but they are not getting it except in isolated cases, but it shows the temper of the market. General asking prices are 1.65¢ @ 1.70¢ for best refined Bars, city delivery, or 1.55¢ @ 1.60¢ at interior points. Steel Bars, 1.60¢ @ 1.90¢, according to quality.

Skelp.—The demand is improving, and manufacturers are talking decidedly better prices, although as yet 2½¢ ¢ 100 lb is all the advance that can be claimed, and then on small lots only. Mills are fairly busy, however, and for the present 1 55¢, delivered, is the usual asking figure.

Plates.—Steady to firm is the usual report from this department. A great deal of business is on hand, and while deliveries in some cases extend a long way ahead, there is plenty of work from the current demand, and prospects are believed to warrant somewhat better prices. As a rule, sales average probably \$1 ¢ ton higher than during last month, but this barely offsets the higher cost of stock, so that manufacturers are feeling around for still another dollar per ton on new business. Competition is sharp, but the feeling is strong, and with the continuance of demand such as during the past two weeks, it is not unlikely that sellers will

gain their point. Meanwhile general asking prices, delivered, are about as follows:

	Iron.	Steel.
Tank Plates.....	1.80 @ 1.85¢	1.80 @ 1.85¢
Shell.....	2.10 @ 2.20¢	2.10 @ 2.20¢
Flange.....	2.70 @ 2.90¢	2.25 @ 2.40¢
Fire Box.....	3.00 @ 4.00¢	2.50 @ 2.70¢
Special qualities.....	3.25 @ 3.75¢	

Structural Material.—There is nothing special going on at present, except a few contracts for Architectural work, which are eagerly competed for at low prices. Mills are well employed, however, and prospects are considered to be encouraging as regards the amount of work, but not particularly so as regards prices, which remain at the lowest point quoted for several weeks past, viz.: Beams, Channels or Tees, 2¢ @ 2.20¢, according to size of order; Angles, 1.80¢ @ 1.85¢; Universal Plates, 1.80¢ @ 1.90¢.

Sheets.—There is a decided improvement in the demand, and orders have accumulated quite largely during the past week or two. Prices are very irregular, and on common qualities are extremely low, but best makes are quoted about as follows for small lots:

Best Refined, Nos. 14 to 20.....	2.75¢ @ 2.85¢
Best Refined, Nos. 21 to 24.....	2.90¢ @ 3.00¢
Best Refined, Nos. 25 to 26.....	3.15¢ @ 3.20¢
Best Refined, No. 27.....	3.30¢ @ 3.40¢
Best Refined, No. 28.....	3.40¢ @ 3.50¢
Common, ½¢ less than the above.	

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about ¼¢ lower than here named:

Best Soft Steel, Nos. 14 to 16.....	2½¢ @ 2½¢
Best Soft Steel, Nos. 18 to 20.....	2½¢ @ 3¢
Best Soft Steel, Nos. 21 to 24.....	3½¢ @ 3½¢
Best Soft Steel, Nos. 25 to 26.....	3½¢ @ 3½¢
Best Soft Steel, Nos. 27 to 28.....	3½¢ @ 3½¢
Best Bloom Sheets, ½¢ extra over the above prices.	

Best Bloom, Galvanized, discount.. 70 and 5 %
@ 70 and 10 %

Old Material.—Dull and irregular, Nos 1 and 2 Wrought Scrap being weak and lower, while Turnings and Borings and good Steel Scrap are in demand at the full prices of last week, viz.: Old Iron Rails, \$18 @ \$18.50, delivered; Old Street Rails, \$19 @ \$19.50; Old Steel Rails, \$15 @ \$16; No. 1 Railroad Scrap, \$15 @ \$16, Philadelphia, or for deliveries at mills in the interior, \$16 @ \$16.50, according to distance and quality; \$8 @ \$9 for clean new No. 2 Light Scrap; \$7.50 for old No. 2 Light Scrap; \$11.50 @ \$12 for Machinery Scrap; \$12 @ \$12.25 for Wrought Turnings; \$8 for Cast Borings, and nominally \$22 for Old Fish Plates, and \$13 @ \$14 for Old Car Wheels.

Wrought-Iron Pipe.—There is nothing favorable to report in this line, prices being weak and in some cases almost on the point of demoralization. Discounts cannot be quoted with any exactness, as all depends on the kind of order that may be presented.

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fifth and Main Sts.,
CINCINNATI, April 5, 1893.

There is a fair volume of business passing in Pig Iron, but there have been no extended purchases made during the week. Buyers are urgent for prompt delivery of current purchases and for all Iron due on previous contracts, but the tone of the market has not improved and prices are as low as ever—in fact, we hear of one sale of No. 2 Foundry made direct by the furnace to consumer as low as \$8.75, f.o.b., Birmingham, and for delivery running through this year. This, of course, is an exceptional transaction on which no commission was paid, but there is no doubt that sales have been made at \$9, f.o.b., Birmingham, although 25¢ more is generally obtained. While there is liberal

melting of Iron by the foundries in nearly all lines of business, yet there is such an abundance of Southern Iron for sale that buyers do not seem disposed to anticipate their wants more than is absolutely necessary. Only the larger and strong Iron companies contend firmly for full prices, and other producers are so numerous as to make it easy to buy at the low rates current. Many hope that stocks will show such a material reduction during the month of March as to favorably affect the trade, but this hope is by no means confident and there are few, if any, furnaces which would not take orders to a liberal extent for immediate or short forward delivery at the current prices. A considerable part of the business here is for Eastern destination, and yet the quantity of Pig Iron passing into consumption in this district is of liberal proportions. Quotations are as follows:

Foundry.

Southern Coke, No. 1.....	\$13.25 @ \$13.50
Southern Coke, No. 2.....	11.75 @ 12.00
Southern Coke, No. 3.....	11.00 @ 11.25
Ohio Soft Stone Coal, No. 1.....	16.00 @ 16.25
Ohio Soft Stone Coal, No. 2.....	15.00 @ 15.25
Mahoning and Shenango Valley.....	14.75 @ 15.00
Hanging Rock Charcoal, No. 1.....	19.00 @ 19.25
Hanging Rock Charcoal, No. 2.....	18.00 @ 18.50
Tennessee and Alabama Charcoal, No. 1.....	15.50 @ 15.75
Tennessee and Alabama Charcoal, No. 2.....	14.50 @ 14.75

Forge.

Gray Forge.....	10.75 @ 11.00
Mottled Neutral Coke.....	10.50 @ 10.75

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	18.00 @ 19.00
Lake Superior Car Wheel and Malleable.....	17.75 @ 18.00

Chicago.

(By Telegraph.)

Office of The Iron Age, 59 Dearborn street,
CHICAGO, April 5, 1893.

The prospective early opening of navigation is influencing prices here on articles which can be shipped from Eastern lake ports at lower than all rail rates. The volume of business handled in this way is increased every year with the better services offered by the growing fleet of steam carriers to Lake Michigan ports, as well as to points reached through towns at the head of Lake Superior.

Pig Iron.—The situation is practically the same as that reported last week. A fair amount of trade has been done in local Coke Iron, the inquiry still being good from a considerable number of consumers. Prices on this class of Iron are quite firm, and transactions are notably increasing at slightly advanced rates. March deliveries from the furnaces here were unusually heavy, running easily 25 % above those of the corresponding month last year. Southern Iron has been rather quiet. Hardly anything has been done to establish prices, but from offers which have been made the condition of the Southern furnaces does not seem to have improved, although the leading companies refuse to meet extremely low prices current within the past two weeks. The Lake Superior Charcoal producers are feeling rather sanguine over their prospects. A better demand is reported in other markets, and not a few furnace companies have already sold their entire product for several months. A good inquiry is reported here, but consumers are not disposed to pay full prices. Offers are made of 25¢ @ 50¢ below quotations, which sellers are refusing to accept. Quotations are as follows, cash, f.o.b. Chicago:

Lake Superior Charcoal.....	\$16.50 @ \$17.00
Local Coke Foundry, No. 1.....	13.75 @ 14.25
Local Coke Foundry, No. 2.....	13.00 @ 13.25
Local Coke Foundry, No. 3.....	12.75 @ 13.00
Local Scotch.....	14.00 @ 15.00
Ohio Strong Softeners.....	16.00 @ 16.50
Southern Silvery, No. 1.....	@ 15.00
Southern Silvery, No. 2.....	@ 14.50
Southern Coke, No. 2.....	13.00 @ 13.35

Southern Coke, No. 3.....	12.60 @ 12.75
Southern, No. 1, Soft.....	13.00 @ 13.35
Southern, No. 2, Soft.....	12.80 @ 12.75
Southern Gray Forge.....	12.25 @ 12.35
Tennessee Charcoal, No. 1.....	16.50 @ 17.50
Alabama Car Wheel.....	@ 18.85
Coke Bessemer.....	14.50 @ 15.00
Hocking Valley, No. 1.....	16.75 @ 17.00
Jackson County Silvery.....	16.75 @ 17.00

Bars.—A continued good business is in progress and some indications have appeared of a little more firmness in values. Good orders have been placed by sharp buyers at 1.57½¢, Chicago, which would indicate that standard mills are maintaining prices for prompt delivery. The wagon builders are still purchasing a great deal of material, but they have been able to secure quite low prices, probably on account of the early opening of lake navigation, when they will receive their shipments by water. The agricultural implement manufacturers are now making their expected appearance. A large contract of this character will be closed some time this week. Prices for immediate delivery are quoted at 1.55¢ @ 1.57½¢, Chicago, half extras, for reasonably early delivery; but these rates are shaded considerably on contracts running into the future. There is a disposition among the mills, however, not to sell beyond July, on account of the possible labor troubles at that time. The experience of last summer is vividly remembered, and strike talk is having more effect than it had last spring. A strong tone is apparent in Soft Steel and quotations are somewhat firmer. While some mills are still selling at 1.65¢, Chicago, others are standing firmly at 1.70¢. Prices from store are quoted at 1.70¢ @ 1.80¢ on Iron and 1.75¢ @ 1.85¢ on Soft Steel.

Structural Material.—The demand for Beams and other building shapes is increasing with the very favorable building weather. Small lots constitute the bulk of the business, no large contracts having been placed the past week so far as can be learned. Buyers are not so much disposed to shop around for low prices as they were last month, although no real advance in quotations has been made. We continue to quote on mill orders, Chicago, as follows: Beams, 1.95¢ @ 2.05¢; Angles, 1.85¢ @ 1.95¢; Universal Plates, 1.90¢ @ 1.95¢.

Plates.—The boilermakers are again agitating for shorter hours, and the prospects seem to indicate a contest over this question, which may close up the shops for a time, as was the case last spring. The demand for Plates has been reasonably fair of late, but manufacturers' agents generally are complaining of the smallness of orders for mill shipment. Dealers are handling the great bulk of the trade, as the lots called for can easily and more promptly be furnished by them. Quotations on mill shipment, Chicago delivery, are as follows, for carload lots: Tank Steel, 1.85¢ @ 1.95¢; Shell Steel, 2.10¢ @ 2.15¢; Flange Steel, 2.25¢ @ 2.30¢; Ordinary Fire Box, 3.50¢. Store prices continue as follows: Nos. 10 to 14 Iron or Steel Sheets, 2.35¢ @ 2.60¢; Tank Steel, 2.20¢ @ 2.40¢; Shell, 2.40¢ @ 2.60¢; Flange Steel, 2.70¢ @ 2.90¢. Boiler Tubes are quoted nominally at 70 %, but concessions are made from this price according to the specification.

Sheets.—The heavy buying of Black Sheets is about over for the present and inquiries are light. Manufacturers' prices have slightly settled as the result of the competition for recent business and carload lots for shipment from mill are now 2.80¢ @ 2.85¢, Chicago, for No. 27 Common. Galvanized Iron has been in much better demand with the more favorable building weather, and prices are slightly firmer, extreme discounts having been withdrawn. The usual rate for mill shipment is 70 and 10 % discount on Juniata,

while small lots are selling at 70 and 5 % from stock. Sheet Copper is unchanged at 80 % discount in small lots from stock, but a little weakness is again apparent in large lots.

Merchant Steel.—Tool Steel has been especially active of late, the trade running mainly to high grades with less attention paid to difference in price. Cheap Steels are in fair demand, but large contracts are being held back until later in the season. Quotations are continued at 2¢ @ 2.20¢, Chicago, for mill shipments of Open-Hearth Machinery and Spring Steel; Bessemer Tire, 1.67½¢ @ 1.70¢, with Bar Iron extras; Tool Steel, 6¢ @ 7¢ for ordinary and 12¢ and upward for specials.

Rails and Track Supplies.—A better inquiry is noted by Rail manufacturers and considerable business was placed the past week in good-sized lots. A noticeable feature is the excellent demand for light Rails, especially for Mine Rails. The demand for this class of material recently has run to comparatively large lots, inquiries being for 100-ton lots instead of carloads. The report current that an additional 15,000 tons of Steel Rails had been placed with the Pueblo Mill by the Chicago, Burlington & Quincy Railroad is denied here. Prices are firm at \$30 @ \$32, Chicago, according to quantity. Iron and Steel Splice Bars are selling at 1.65¢ @ 1.70¢; Track Bolts with Hexagon Nuts, 2.60¢ @ 2.65¢; Spikes, 2¢ @ 2.10¢.

Old Rails and Car Wheels.—Business has been quiet in these specialties. Old Iron Rails are still nominally quoted at \$18; Old Steel Rails at \$11.25 @ \$15, according to length, and Old Car Wheels at \$14.50 @ \$14.75.

Scrap.—The demand is somewhat better for nearly all classes of Scrap and more material is moving to outside consuming points. Prices, however, have not improved and quotations are unchanged. Dealers continue to quote as follows per net ton: No. 1 Forge, \$15; No. 1 Mill, \$10.50; Sheet Iron, \$6; Pipes and Flues, \$10; Axles, \$21; Horseshoes, \$15.50; Fish Plates, \$16.50. Spikes and Bolts, \$14.50; Cast Borings, \$5.50; Wrought Turnings, \$8; Axle Turnings, \$9.50; Heavy Cast, \$11.50; Stove Plate, \$8.50 @ \$9; Malleable Cast, \$9; Mixed Steel, \$10 @ \$10.50, gross ton; Leaf Steel, \$17.75.

Metals.—Copper is unchanged at 12½¢ for carload lots of Lake and 11½¢ for Casting brands. Spelter is somewhat stronger and may be quoted at 4.10¢ here, sales having been made at a slight advance over last week's quotations. In Pig Lead the week has been dull, with practically no change in values. Local consumers bought rather freely at 3.70¢ @ 3½¢, but hesitate to pay advanced prices. The market closes very steady at 3.80¢, freely bid. Lead is offered in a limited way at 3.85¢, but sellers are generally asking 3.90¢.

Louisville.

LOUISVILLE, April 3, 1893

The market has been quiet with but little buying, prices remaining the same. Both for early and late delivery Gray Forge Iron at \$8, Birmingham, can be obtained. There is an abundance of work among car companies and rolling mills, and pipe companies are running fuller than for some time. Charcoal Irons are in light demand. Old Wheels can be obtained, basis \$13.25, Louisville. The largest sales during the week have been of Gray Forge and Mottled. We quote for cash f.o.b. cars, Louisville:

Southern Coke, No. 1 Foundry...	\$13.00 @ \$13.25
Southern Coke, No. 2 Foundry...	12.00 @ 12.25
Southern Coke, No. 3 Foundry...	11.00 @ 11.25
Southern Coke, Gray Forge...	10.75 @ 11.00
Spathite	11.50 @ 12.50
Southern Charcoal, No. 1 Foundry	15.00 @ 16.00
Southern Car Wheel.....	17.50 @ 17.75

Strong inducements have been offered to the Birmingham Rolling Mill Company to come here, and as the owners of the company largely reside here, it is reported that they meet with considerable favor.

St. Louis.

(By Telegraph.)

Office of The Iron Age.
Bank of Commerce Building,
St. Louis, April 5, 1893.

Pig Iron.—The local demand for Pig Iron is very quiet, consumers apparently having full supplies on hand. No. 2 Foundry seems to be even weaker than last reported, and sales are reported on the basis of less than \$9, f.o.b. cars, Birmingham. Gray Forge seems to be satisfied with reaching \$8 as low-water mark, and at that price some fairly good sales have been made. We have heard of less than \$8 being quoted for Gray Forge, but the difference amounted to only a few cents, and \$8 is practically the market. No. 1 and No. 2 Soft Irons are in good demand, and the prices for these grades are a trifle firmer than the balance of the market. There is some talk of blowing out by one or two Southern furnaces, but at this writing there is nothing definite in this direction. Production continues unchanged, and while the demand does not show any great improvement, the outlook for an increased consumption is considered encouraging. We quote as follows for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry,	\$13.50 @ \$14.00
Southern Coke, No. 2 Foundry,	12.25 @ 12.50
Southern Coke, No. 3 Foundry,	11.75 @ 12.00
Southern Gray Forge.....	11.25 @ 11.50
Southern Car Wheel.....	18.00 @ 18.75
Lake Superior Car Wheel.....	17.00 @ 17.50
Ohio Softeners	16.25 @ 17.00
Missouri Charcoal, No. 1 Foundry.....	13.50 @ 14.00

Bar Iron.—The demand for Bar Iron continues to show improvement, although prices remain virtually unchanged. There appears to be a firmer tone to the market, however, and any increase in the demand will doubtless make itself felt in prices. We quote as follows: Lots from mill command 1.57½¢ @ 1.60¢, half extras, f.o.b. cars East St. Louis. Jobbers quote 1.75¢ for lots from store, which would be shaded on large orders.

Barb Wire.—The demand from all sections is remarkably heavy, and jobbers and manufacturers have all they can well attend to. Spring trade is opening up in excellent shape, and will doubtless prove very heavy. Prices do not appear as strong as the circumstances would warrant. An early improvement in this direction is expected, however, and dealers would do well to anticipate their wants, as all indications point to a heavy demand. We quote as follows: Painted to jobbers in carload quantities, \$2.20; Galvanized, \$2.60.

Wire Nails.—A heavy demand is reported by manufacturers, and jobbers are replenishing their broken stocks. The spring demand will doubtless be heavy, and prices are in a fair position to advance. At the moment we quote \$1 70 rate in carload quantities to jobbers.

Pig Lead.—The improvement noted in this metal in our last report continues to be a feature of the market, and sales are made on the basis of 3.80¢ @ 3.82½¢, 150 tons selling at the former price to-day, with bids of 3.82½¢ for additional lots. There is a decided scarcity of this metal, and if the London market would show some little strength a higher range of prices would be in order here. The market closed to-day at 3.82½¢.

Spelter.—The steady production of Spelter prevents any possibility of ad-

vance in the near future. Sales are made for May delivery at 3.95¢ and producers seem satisfied with this price. The consolidation spoken of last week came to naught, as the fourteen concerns represented failed to agree on any plan whereby the market could be benefited.

Freight Rates.

	Per ton.
Birmingham, Ala., to St. Louis.....	\$3.25
Chattanooga, Tenn., to St. Louis.....	3.00
Sheffield, Ala., to St. Louis.....	2.80
Barb Wire and Wire Nails.....	Per cwt.
Pittsburgh, Pa., to St. Louis.....	18½¢
Salem, Ohio, to St. Louis.....	16½¢
Cleveland, Ohio, to St. Louis.....	15¢
Anderson, Ind., to St. Louis.....	11¢

Cleveland.

CLEVELAND, OHIO, April 3, 1893

Sales of Non-Bessemer Ore, high in phosphorus, at \$2.75 ¢ ton are reported to-day. These Ores are mixed with a better grade of Non-Bessemers, bringing \$3 @ \$3.35 ¢ ton, and a good grade of iron. Some Bessemers from the Tilden, formerly the Colby, and from the Aurora and Norrie Mines have been sold during the past week, but in scattering quantities. Up to the present writing the heavy buyers have not dipped into the market, and it is the consensus of opinion about the big Ore offices here that the aggregate sales of Ore, both Bessemer and Non-Bessemer, to date do not exceed 750,000 tons, and this is considered a very liberal estimate. If the boom for Bessemer Iron had continued the Ore market would now have been remarkably active. As it is the demand for good Bessemer Irons is not active, and in place of the \$14.25 @ \$14.35 quotations of two weeks ago to-day's prices are \$14.10 @ \$14.15. Some Bessemer Ores are being taken every day at about \$3.90 @ \$4.10 ¢ ton, f.o.b. cars Cleveland, Fairport and Ashtabula, but the buying is really very light as yet, and until freight rates are agreed upon it is not easy to determine when heavy buyers like the Illinois Steel Company and the Carnegies will enter the market. Rumors of vessel charters for transporting Ore have been made, but these really amount to little. The Ashland rate will very probably be \$1.10 ¢ ton, and the rates from Marquette and Escanaba correspondingly reduced from early season estimates.

No one would be surprised if the heavy buying movement should begin at any time.

Iron Ore.—During the past week about 35,000 tons of Ore have gone forward to the furnaces, as compared with 28,000 tons for the corresponding week last year. The market is rather quiet owing to the fact that Bessemer Irons have not quite held their own.

Pig Iron.—Bessemer Irons have weakened slightly and are quoted to-day at \$14.10 @ \$14.15. The interruption incidental to an unusually exciting local election has temporarily diverted attention from the Iron interests, but this is likely to be renewed to-morrow. Not a very large amount of Ore has changed hands during the past week. Gray Forge Iron is quite firm at \$12.40 @ \$12.50. Buyers are not making very liberal demands this week and say that they are fairly well supplied for the month of April.

Scrap.—The market continues dull, with the following quotations in force: No. 1 Railroad Wrought, \$15 ¢ ton; Cast Scrap, \$11 ¢ ton; Wrought Turnings, \$10 ¢ ton; Cast Borings, \$7 ¢ ton.

Old Rails.—A sale of Old Americans at \$19.50 is reported, but the demand is rather weak. The supply large.

Muck Bar.—The market is still weak. Muck Bars are not firm, even at \$24 25 ¢ ton, Cleveland.

Old Wheels.—One or two scattering sales are reported at \$14 @ \$14.25.

Barb Wire.—The demand has been higher during the past week, and prices are firmer. An exceptionally good spring trade is anticipated.

Freights.—Railroad and furnace men are endeavoring to arrange on a new schedule of rates from Lake Erie ports to the furnaces. The new tariff will likely be promulgated in a day or two. A slight reduction from last season's figures is expected.

(By Telegraph.)

Some non-Bessemer ores just outside of the Bessemer limit are selling at \$3 50 $\frac{1}{2}$ ton. These are intended for mixture with non-Bessemer Ores that are low in Iron, and that can be bought this season as low as \$2.75 $\frac{1}{2}$ ton, f.o.b. Cleveland. Some Bessemer Ores are selling at \$3.90 $\frac{1}{2}$ ton, but the real active buying movement has not begun.

Boston.

Office of *The Iron Age*, 146 Franklin St.,
Boston, April 4, 1893.

Generally there is only a quiet trade to note in the Iron and Steel markets here, but there is a good volume of business going on as compared with other seasons. Manufacturers and machinists are unusually busy, but the offerings of stock in the shape of Iron and Steel are so free that these manufacturers dictate their own terms to a greater extent than is usually the case. The production of Pig Iron is enormous, and the producers are all anxious sellers, and though the foundry people are using more Iron than usual, yet they buy at nearer to their own terms than at almost any period in the history of the trade.

Pig Iron.—Trade in Pig Iron is quiet and the tendency is slightly in the buyers' favor. There is a better call for Virginia Iron than almost any other Iron sold here, and the dealers say that they could sell more of it if they could get it fast enough. The quotations on Southern Iron are at: No. 1, \$15 @ \$15.50; No. 2, \$14 @ \$15; No. 3, \$13.50 @ \$14. Virginia Iron is quotable at about \$15.50 for No. 1. The above quotations on Southern Iron are for Iron on the dock in Boston. Pennsylvania Iron is in very quiet demand in this market, and it is admitted that prices are more in the favor of the buyer. The market for Iron at shipping port is quotable at: No. 1, \$15; No. 2, \$14.50; Gray Forge, \$13 @ \$13.50. Western Irons are in fair demand, with the market at \$17 @ \$19 for Iron on dock at Boston, according to quality.

Bar Iron.—The strongest feature in the market on Bar Iron is the fact of the strong market on Steel Billets. The Worr mill at Wareham is being run to complete orders and run up the stock of Old Iron on hand. Bar Iron is quoted at: Ordinary Old Material Bars, from mill 1.60¢ @ 1.65¢; from store, 1.65¢ @ 1.70¢. Best Puddled Iron Bars are quoted at 1.85¢ @ 1.95¢ from mill; from store, 2.20¢ @ 2.4¢. Norway and Swedish Bars are quiet at \$65 @ \$67 $\frac{1}{2}$ ton for bars and shapes out of store.

Building Iron.—The market on Building Iron is more quiet. Only a few contracts have been placed the past week, and these at easier prices, slightly, it is complained. One contract of some 200 tons is mentioned for a building in Boston. There are other contracts hanging, but the contractors expect lower prices than manufacturers at Pittsburgh will authorize agents to accept. The market is nomi-

nally little changed in quotations at: Beams and Channels, 2 07 $\frac{1}{2}$ ¢ @ 2.20¢ from mill; from store, 2 $\frac{1}{2}$ ¢ @ 2.30¢; Angles, 2¢ @ 2.10¢ from mill; from store, 2 $\frac{1}{2}$ ¢ @ 2 $\frac{1}{2}$ ¢; Tees, 2.40¢ @ 2 $\frac{1}{2}$ ¢ from mill; from store, 2 $\frac{1}{2}$ ¢ @ 2 $\frac{1}{2}$ ¢.

Steel, Steel Plates and Steel Rails.—The market on Soft Steel is firm, from the fact that the firm position of Billets is sustained, following the very firm market on Bessemer Pig. Manufacturers notify agents here that they believe the strength in Bessemer Pig has come to stay. They also suggest care in the taking of orders for Steel. At present the market is quoted at: Bessemer Steel, 2 05¢ @ 2.20¢; Machinery, 2¢ @ 2.15¢; Tire and Sleigh Shoe, 2¢ @ 2 10¢; American Cast, 7¢ @ 7 $\frac{1}{2}$ ¢; English Cast, 13¢ @ 15¢. American Steel Rails are yet quoted at \$29 at mill, but buyers hold off. There is a deep-seated impression that Rails should be lower, with the feeling that it is the combination only that holds the market up. Hence any news suggesting disaster to the combination is eagerly sought for. Steel Plates seem to have sustained the stronger position mentioned last week, though trade is dull. The quotations are at: Tank, 1.95¢ @ 2¢; Shell, 2.05¢ @ 2.10¢; Flange, 2 $\frac{1}{2}$ ¢ @ 2.35¢; Fire Box, 2.60¢ @ 3 30¢.

Nails.—The demand for Nails is pretty good, with the market steady. Cut Nails, both Iron and Steel, are steady at \$1.50 for carload lots, and at \$1 60 $\frac{1}{2}$ keg for smaller lots. Steel Wire Nails are steady, with the list of extras the same as on Cut Nails.

Pipe and Tubes.—The dealers in Pipe note a rather dull market, though there is something doing in the way of water contracts. There is a complaint of prices being cut, with the explanation from some of the best in the trade that there are too many manufacturers, and that they are constantly yielding in prices for the sake of a trade that can pay them only very little at the best. The Pipe card is nominally unchanged, however. Boiler Tubes are steady at 65 % off from the list on all sizes.

Scrap Iron.—There is generally a rather better request for Scrap, though the market is still far from being a real active one. No. 1 Wrought is quoted at 50¢ $\frac{1}{2}$ 100 to buy from the collectors and savers, but at 60¢ to sell good assortments delivered at the mill where used. Old Horseshoes and special sizes of No. 1 Wrought Scrap are quotable at 60¢, while special lots, delivered at the mill where wanted, would command as high as 65¢ @ 70¢, as to quality. Light Iron is dull at 30¢ @ 40¢. Machine Shop Scrap is quiet at 25¢ @ 30¢ for Cast and at 30¢ @ 35¢ for Wrought.

Metal Market.

Copper.—The conditions are practically the same as outlined in last week's review of the market. In any event, the turn from the first to the second quarter of the year has witnessed no change in the attitude of buyers, and even with seven or eight months' restriction upon production there is still more than enough Copper to go around. For that matter, the surplus is sufficient to have more or less depressing effect upon values, and has brought the market into a condition of feverishness, the end of which is extremely problematical. At present there are sellers of Lake Superior Ingot for prompt delivery at 11 $\frac{1}{2}$ ¢, regular terms, and Exchange contracts running as far as August have been offered at the same price, without attracting buying orders. Cakes and Wire Bars for prompt delivery brought some premium

over that price, but the demand for those is rather disappointing and orders for round lots could probably be placed at prices very close to current quotations for Ingot. Casting Copper is also easier. In fact, 10 $\frac{1}{2}$ ¢ has become a common selling price for round lots, while transactions involving only moderate quantities were effected at 10.70¢, if, indeed, not at a shade less.

The monthly report of the Bureau of Statistics affords the following comparison of exports of copper from the United States:

Ore-To	February,		Eight months ending	
	1893.	1892.	1893.	1892.
	Tons.	Tons.	Tons.	Tons.
United Kingdom.....	1,300	2,723	26,708	20,315
Germany.....	.....	.....	78	2,013
Other Europe.....	.....	.....	.....	100
Total.....	1,300	2,723	26,786	21,428

Ingots-To	February,		Eight months ending	
	1893.	1892.	1893.	1892.
	Pounds.	Pounds.	Pounds.	Pounds.
United Kingdom.....	225,000	445,815	.....	.....
Germany.....	172,516	1,045,483	.....	.....
France.....	23,740	991,847	.....	.....
Other Europe.....	917,075	554,425	.....	.....
Other countries.....	.....	5,000	.....	.....
Total.....	2,138,329	3,042,570	.....	.....

Ingots-To	February,		Eight months ending	
	1893.	1892.	1893.	1892.
	Pounds.	Pounds.	Pounds.	Pounds.
United Kingdom.....	1,969,117	12,296,571	.....	.....
Germany.....	2,290,306	5,312,537	.....	.....
France.....	7,063,087	17,852,288	.....	.....
Other Europe.....	6,605,578	10,695,110	.....	.....
Other countries.....	57,767	46,031	.....	.....
Total.....	17,955,875	46,203,567	.....	.....

Pig Tin.—The inevitable working of the law of supply and demand has dispelled the visions of the "bull" interest and turned prospective profits into realistic losses. The McKinley duty "boom," has disappointed its fathers, chiefly because of the fact that sellers on one end of the line have put out more Tin than the buyers on the other end could conveniently take care of. The accumulation has become burdensome to an extreme and the odds are that the surplus will be heavier at the end of the present month. There is more than a bare chance also that "invisible" supplies will have some weight during the interval. A reflection of what the "bull" interest have to contend against may be discovered in the statistics presented below. Since our last report, the net cash price for Straits Tin has dropped about 40¢ $\frac{1}{2}$ 100 lb. Numerous "short" sales were covered at the decline, and advantage was taken of "seller's right to double" contracts in a manner anything but pleasant to operators who bought on that form of contract. Trade and consumptive demand has been only fair and doubtless checked to some extent by the depressed condition of the market.

Below we give the total statistics for Europe and the United States, as compiled by the New York Metal Exchange, showing: Total visible supply April 1, 1893, 17,855 tons; against total visible supply March 1, 1893, 15,959 tons; against total visible supply April 1, 1892, 13,039 tons.

Shipments During March and February.

	Mar.	Feb.
	Tons.	Tons.
Straits to Great Britain.....	3,750	1,450
Straits to Continent Europe.....	350	325
Straits to United States.....	1,080	880
Total from Straits.....	5,180	2,655
Australia to Great Britain.....	250	180
Australia to United States.....	50	50
Total from Australia.....	300	230
London to United States.....	2,050	600
Holland to United States.....	40	140
Total from Europe.....	2,090	740

Consumption, London deliveries, 1,500	1,380
Consumption, Holland deliveries, 710	700
Consumption, U. S., excl. Pacific ports, 1,800	1,600
Total.....	4,010
Stock, London.....	3,558
Stock, Holland.....	1,720
Stock, U. S., excl. Pacific ports, 3,692	2,864
Total stock at the close of month.....	8,970
Afloat, London.....	5,000
Afloat, Holland.....	600
Afloat, U. S., excl. Pacific ports, 3,285	2,820
Total afloat at the close of month.....	8,970

Pig Lead.—During the greater portion of the week under review prices dragged on the level of 4 05¢ for Common Domestic and 4 10¢ for corroding quality. In the interval somewhat extensive purchases were made by large consumers that not only cut rather deeply into spot stocks, but materially curtailed the offering for early shipment from the West. The outcome was a hardening of prices all along the line and very firm tone to the market at the close. At this writing 4 10¢ would appear to be bottom price for common Western. Some single carload lots have been sold at that during the past few days.

Spelter.—Transactions in this market have been on a smaller scale and the demand shows hardly the degree of life that was displayed a week ago. Prospects for successful outcome of the proposed combination of producers seem somewhat dubious and that fact along with continued heavy output may account in a good measure for the more conservative tendency of buyers. However, prices are still held at 4 30¢, delivered, for carload or larger lots of prime Western brands.

Antimony.—The demand has been of merely routine character and prices are barely steady at 10¢ @ 10 1/4¢ for Hallett's, 10 1/4¢ @ 10 1/2¢ for LX and 10 1/2¢ @ 10 3/4¢ for Cookson's.

Tin Plate.—Deliveries from late heavy arrivals supply trade requirements to a great extent. The probabilities are that arrivals will continue heavy for some time, as large amounts of Plates have been shipped from abroad in order to avoid probable higher rates of ocean freight. Purchases for both prompt and future deliveries are, therefore, moderate, and the business passing is practically at old prices. Spot quotations are as follows: Coke Tins—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., scarce; Bessemer full weight, \$5 50; light weights, \$5 10 @ \$5 12 1/2 for 100 lb, \$5 for 95 lb, \$4 90, nominal, for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5 60 @ \$5 65; Siemens Steel, IC basis, \$5 75; IX basis, \$6 85. Charcoals—Melyn grade, IC, scarce; Crosses, \$8; Allaway grade, IC, \$5 70; Crosses, \$6 90; Grange grade, IC, \$5 80; Crosses, \$7. Charcoal Ternes—Worcester, 14 x 20, \$5 70; do., 20 x 28, \$11 85; M. F., 14 x 20, \$7 25; do., 20 x 28, \$14 50; Dean grade, 14 x 20, \$5 30 @ \$5 37 1/2; do., 20 x 28, \$10 50 @ \$10 70; D. R. D. grade, 14 x 20, \$5 20; do., 20 x 28, \$10 30; Wasters—S. T. P. grade, 14 x 20, \$5; do., 20 x 28, \$9 70; Abercarne grade, 14 x 20, \$4 95; do., 20 x 28, \$9 50. Back Plates for tinning, to arrive, are quoted at \$3 65 @ \$3 70 for IX, and \$3 70 @ \$3 75 for IC, to arrive.

William F. Jarvis of the Newberry Building, Detroit, has been appointed sales agent of the "Lunden" Salisbury charcoal pig iron. The furnace will soon be again in blast.

Financial.

With the gradual disbursement of some \$50,000,000 in the shape of interest and dividends, due April 1, all the markets experience a sense of relief. The feeling of stringency prevalent of late in all directions has undoubtedly hampered trade to no small extent; as collections have been slow, merchants could not readily sell their bills because banks had not the money to spare, and accommodations of any kind were reluctantly granted. Even now the financial future is not cleared of doubt, for, although Saturday's bank statement shows that the surplus reserve has increased and that loans were but slightly contracted, the renewal of gold exports shows that a plethora of money cannot be expected immediately. The hope of easier money and the chance of lower freight rates on the opening of navigation have both had a retarding effect. Bearing on the general topic as related to gold exports, Henry Clews says: "In view of the abnormally large stocks of exportable products, it seems almost inevitable that our exports must materially increase from this time forward; and if the exports should be proportioned to the over-supplies, the outflow of gold might easily fall below the usual average. In other words, it is reasonable to suppose, all other things being equal, that during the next three months the merchandise exports will largely take the place of gold shipments." This view is strengthened by the lower price of wheat since the defeat of the Chicago clique, also by the break in pork and provisions, and the improved outlook for the foreign consumption of cotton, the export demand for these commodities having already revived. On Monday the failure of the Commercial Bank of Australia was used against the market.

Stocks, after a severe hammering, took a favorable turn, in prospect of easier money and large railroad earnings as a consequence of the World's Fair boom. On Monday Western stocks were slightly affected by the threat of engineers and firemen at Toledo to strike rather than to handle cars or freight of roads connecting with the Toledo, Ann Arbor & North Michigan. The news of the engagement of \$1,500,000 gold for export to Europe had little effect. The decision of Judge Ricks in the United States Circuit Court at Toledo against the striking engineers imparted a firmer tone to Western railroad stocks. Manhattan was the feature, and was largely sold on the report that a syndicate is ready to provide capital for an underground rapid transit system. All the industrials were erratic. Cordage advanced rapidly and Chicago Gas was freely bought. Sugar was inclined to sag on the report of a proposed new investigation into the company's organization and methods.

United States bonds were strong at the following quotations:

U. S. 4 1/2s, 1891, extended.....	99 1/2
U. S. 4s, 1907, registered.....	113
U. S. 4s, 1907, coupon.....	113
U. S. currency 6s.....	105

The loan market during the week reflected the preparation made for April disbursements. Time loans were in good demand, 6 per cent. being still the usual rate on such contracts, and in some instances bankers stipulated for gold rates. The market for commercial paper was again restricted, and the Street rate for the best names was about 7 per cent. The bank return showed a gain of \$1,376,300 in cash, and of \$1,419,875 in surplus reserve, which now stands at \$10,663,075. The outflow of gold is supposed to depend mainly upon the condition of the loan market in New York. As concerns the Treasury at Washington, New York bank-

ers feel no solicitude, the receipts from customs duties having surprisingly increased and various economies have been introduced. So it is believed that the Department can pull through until Congress meets. Receipts from all sources for the three-quarters of the current fiscal year aggregate in round numbers \$296,000,000, against \$268,000,000 for the same months of the preceding fiscal year, while expenditures during the last nine months were \$298,000,000, against \$263,000,000 during the corresponding months of the preceding year.

The grain market has been weak under the influence of speculation, wheat closing a fraction lower. Trading in cotton and raw sugar was much more active, at an advance, refined improving about 1/2 cent per pound. Coffee quiet. Dry goods in some directions were easier.

The history of the Sherman silver law shows that from the beginning of its operation silver has constantly declined in value. The amount purchased up to December 31, 1892, cost \$124,652,429, averaging \$0.96 per ounce, and purchases last year cost \$47,394,291, averaging \$0.875 per ounce. The amount stored in bars January 1, 1893, cost \$96,499,989.

Exports of merchandise from New York for the week were \$6,461,000, and since January 1 \$90,269,000, against \$114,683,000 for the same time last year. Imports for the week \$14,331,000, and since January 1 the increase is \$30,000,000.

Coal Market.

The Coal market is dull and slumpy all around. Just now the Bituminous trade is exercised on account of the low contract of the Long Island Railroad Company which has been closed with R. B. Wigton & Co., at less than \$2.70 per ton for 80,000 tons, delivered at Hunter's Point. It is known that the railroads were expecting to get 15¢ more per ton for transportation, but with such prices as that just quoted operators do not see how this can be done. Bituminous Coal is in good supply, so that some of the Clearfield mines are known to have shut down, as supposed from the effects of severe competition.

In the Anthracite Trade the resignation of Mr. McLeod from the Reading is startling news, as nothing of the kind was looked for. The trade reasons that he was simply crowded out, the funds at command proving insufficient to carry through the immense projects of the combine. Of course the combine no longer exists, nor has it been extant since the withdrawal of the Jersey Central. The Reading and Lehigh are alone, under a single management. "Company prices" now rule, and these several companies fall back as they were, renewing former tactics, which meant little more than meeting once a month or so, agreeing to maintain a schedule, and each concern afterward doing as it thought best. Prices remain unchanged, McLeod's retirement being too recent for effects to be seen or even conjectured. Talk of an advance in June or any other time this season is absurd, unless it is intended simply to be made on paper. The April output is calculated at 3,000,000 tons. The Reading Railroad has reduced the rate of tolls on Anthracite from the Schuylkill region 5¢ per ton, the new rates being \$1.70 per ton for prepared sizes, \$1.40 for P-a, and \$1.25 for Buckwheat. The Reading tonnage for week was 400,000 tons, of which 55,000 tons went to New York waters. Pennsylvania Railroad tonnage for week, 336,958 tons Coal and 112,824 tons Coke. Increase for one year 443,000 tons.

New York.

Office of *The Iron Age*, 96-102 Reade street, }
New York, April 5, 1893. }

Pig Iron.—The market is very quiet, although it is pointed out as a feature that quick delivery is usually demanded by consumers. Both Alabama and Virginia Irons are occasionally pressed for sale. We quote Northern brands at \$14.50 @ \$15.25 for No. 1; \$13.75 @ \$14.50 for No. 2; \$12.75 @ \$13.50 for Gray Forge, tide-water. Southern Iron, same delivery, \$14.25 @ \$14.50 for No. 1; \$13 @ \$13.75 for No. 2 and No. 1 Soft; \$12 @ \$12.50 for Gray Forge.

Spiegeleisen and Ferromanganese.—An Eastern Rail mill has taken a block of 5000 tons of German 10 to 12 per cent. Spiegeleisen, in addition to about 3000 tons of 20 per cent. English Spiegeleisen purchased about three weeks since. Ferromanganese is selling at \$57 @ \$57.50 ex-ship, the business being quiet, with the majority of importers quoting higher figures.

Billets and Rods.—The works nearest to this market are reported to be full of orders, having taken large business from an Eastern Wire mill some time since. It is reported that an effort is being made to contract for Billets for delivery in the Chicago district with tidewater works. A mill in Eastern Pennsylvania is also in the market for 5000 tons of Wire Billets. We quote Steel Billets, tidewater, \$25 @ \$25.25; foreign, \$29 @ \$29.50; Wire Rods, \$33.00 @ \$33.50; foreign Wire Rods, nominally, \$40 @ \$40.50, and Swedish Rods, \$52.50 @ \$53.

Steel Rails.—Sales by Eastern mills aggregate only about 8000 to 9000 tons, including one block of 5000 tons. The market continues quiet, with the majority of roads in this territory pretty well covered for renewal requirements, and little new construction work coming up. The policy of laying Rails running from 80 to 100 pounds to the foot is bringing into the market considerable quantities of 60 to 70-pound Rails, which are offered as fit to relay. In some cases, however, they will probably have to go as scrap. We quote \$29, mill or tidewater, for Standard sections and \$31.50 @ \$32.50 for Girder Rails.

Track Material.—Spikes are quoted at 1.90¢ @ 1.95¢; Fish Plates at 1.55¢ @ 1.60¢; Track Bolts, square nuts, at 2.45¢ @ 2.50¢, and hexagon nuts at 2.55¢ @ 2.60¢, delivered.

Manufactured Iron and Steel.—Aside from a good run of small orders there is nothing of special interest to report, no contracts of magnitude having been placed outside of the Kuhn-Loeb building. There is a good deal of figuring being done, however, and quite a number of office structures of moderate size will be closed soon. The consumption of small lots of Beams for apartment houses, tenements and stores promises to be exceptionally heavy this year. A very heavy piece of work in the way of elevated structure is now in the market for the Park avenue improvement, in which the city and the New York Central road are interested. We understand that this will call for about 17,000 tons of Structural Material, and that the bids are to be opened towards the close of this month. In Plates there have again been evidences of extreme irregularity. The material for two ships at Newport News is soon to be placed. We quote: Beams up to 15 inch, 1.95¢ @ 2.15¢; 20-inch, 2.30¢ @ 2.40¢ for round lots; Angles, 1.8¢ @ 2¢; Universal Mill Plates, 1.85¢ @ 1.90¢; Tees, 2.10¢ @ 2.30¢; Channels, 2.10¢ @ 2.20¢, on dock. Car Truck Channels, 2¢ @ 2.10¢. Steel Plates are 1.80¢ @ 2¢ for Tank; 2.10¢ @ 2.25¢ for Shell; 2.25¢ @

2.50¢ for Flange, and 2.50¢ @ 2.80¢ for Fire Box, on dock. Refined Bars are 1.65¢ @ 1.9¢, on dock, and common 1.55¢ @ 1.60¢. Scrap Axles are quotable at 1.90¢ @ 2.10¢, delivered. Steel Axles, 1.85¢ @ 2¢, and Links and Pins, 1.85¢ @ 2.10¢; Steel Hoops, 1.80¢ @ 1.90¢, delivered; Cotton Ties, 80¢ @ bundle, at mill.

Merchant Steel.—The market is dull, with Machinery at 1.75¢ @ 2¢; Toe Calk, 2¢ @ 2.25¢; and Sleigh Shoe, 1.75¢ @ 1.90¢.

Old Material.—With the approach of the active period of track renewal, a good many Old Rails are being offered in the market, in the face of a very considerably restricted consumption. So many of the rolling mills which depended largely or wholly upon Old Iron Rails as their raw material have gone over to Steel Billets, that the days seem over when it was possible at nearly all times to place large blocks at a price. How great in dollars the difference between Steel Billets and Old Iron Rails must be to induce buyers to take hold of the latter has not, we believe, become generally known in the trade. Data relating to this subject would be of great interest. As we have stated, the offerings are quite large relatively. We know of one block of 5000 tons at Chicago, one of 2000 tons at St. Louis, of 4000 tons in New York and 2000 tons in New England, all seeking buyers. In Old Steel Rails, the offerings are also large. About 8000 tons are seeking buyers in New York and 2000 tons in New England. We quote nominally \$16.50 @ \$17 for Old Iron Rails; \$13 @ \$13.50 for Old Steel Rails; \$15.75 @ \$16 for No. 1 Scrap, and \$12.50 @ \$13 for Old Car Wheels, f.o.b. Jersey City.

Stock Warants.—Return of stocks, &c., by American Pig Iron Storage Warant Company.

	Tons.
Stock in yard February 23, 1893.....	78,900
Put in yard for 31 days ending March 31, 1893.....	1,300
Total.....	80,200
Withdrawn 31 days ending March 31, 1893.....	2,300
Net stock in yard March 31, 1893.....	77,900

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, }
Pittsburgh, April 4, 1893. }

The first week in the second quarter of the year does not present any specially new features over the closing week in March. The higher prices for Bessemer Pig and Billets are being fairly maintained, with only a limited demand for both. In Wire Nails and Wire, further sharp advances have taken place during the week, with some concerns unable to take additional orders for delivery within the next 60 or 90 days, as their product is entirely sold up, some as late as July. Wire Rods, which have been dull and neglected for so long, have advanced fully \$1.50 per ton within a month, with the demand considerably improved. In Structural Material and Plates the condition of trade is not satisfactory, either as regards demand or prices. The fear is being expressed that possibly the makers of Plates and Structural Shapes expected a heavier trade than will be realized. Capacity for production in both lines is extremely large and it will require a tonnage out of the ordinary to keep everybody busy. Pipes and Tubes are a little better in demand and price, and some very low quotations have been withdrawn.

As the time approaches for the Amalgamated Association of Iron and

Steel Workers to hold their annual convention in this city, the usual rumors are afloat in regard to strikes and lock outs. Little reliance should be placed upon these rumors. It is the impression in well-informed quarters that the different wage scales for 1893-94 will be arranged this year between manufacturers and workmen without recourse to strikes or lockouts.

Bars.—Within the past week or two the call for Bars has improved considerably, and the outlook at this time is much better. Orders from country customers are increasing, and, with the roads in good condition again, there will doubtless come a good tonnage from this class of trade. Railroads are also buying more freely, so that all in all the situation has considerably improved. On account of the advance in Billets, prices of Steel Bars are firmer, and we now quote at 1.55¢ @ 1.60¢; half extras. In the Mahoning Valley, Bars are held at 1.42¢ @ 1.45¢, half extras, at mill.

Structural Material.—Considerable disappointment is being expressed by makers here over the fact that the demand which was expected to come with the opening of spring trade has not as yet made its appearance to any marked extent. A month or two ago all indications pointed to a very heavy tonnage in Shapes of all kinds, and while it is true that a fair tonnage is going in small lots, the demand at this time is not anything like as large as makers expected. Prices, too, have not shown any inclination to advance, but on the contrary have weakened to some extent, and we now quote Beams and Channels on a basis of 1.75¢ @ 1.80¢, f.o.b. cars Pittsburgh; Angles, we quote at 1.65¢ @ 1.70¢; Z Bars, 1.85¢ @ 1.90¢, and Tees at 1.90¢ @ 2¢.

Plates.—The best that can be said this week under the above head is that a moderate amount of business is going, and prices are fairly well sustained. The demand for Boiler Plate at this time is quite heavy, and if the tonnage in the other kinds of Plates was as large in proportion makers would have very little to complain of as far as demand is concerned. The advance in Bessemer Pig and Soft Steel has not as yet affected Plates, and, as stated before, prices are shaded. There are no indications apparent just now of any advance in prices. We continue to quote Ordinary Fire Box at 2.25¢ @ 2.50¢; best Quality, 3¢ @ 3.25¢; Flange, 1.90¢ @ 2¢; Tank, 1.65¢ @ 1.70¢; Shell, 1.75¢ @ 1.80¢; Universal Plates, 1.70¢ @ 1.75¢.

Ferromanganese.—A fair demand is going, with prices unchanged on a basis of \$59 @ \$59.25 for 80 %, f.o.b. cars Pittsburgh.

Muck Bars.—Demand continues dull, and within the past week or two prices have eased off to some extent, and we now quote Muck Bars of best grade at \$24 @ \$24.15, f.o.b. cars Pittsburgh. We note a sale of 300 tons at last named price for April delivery.

Wire Rods.—Owing to increased cost of Billets and also a materially improved demand, prices on Wire Rods have scored an advance within the past week, and the market is firm on a basis of \$31, f.o.b. cars Pittsburgh. Offers of \$30.50 within the past week have been declined by makers in Pittsburgh and also in other sections.

Wire and Cut Nails.—As announced last week, a meeting of Wire Nail manufacturers was held in the Weddell House, Cleveland, on Thursday, March 30, which was well attended, every member of the association being present with the exception of one or two concerns in Pittsburgh. At this meeting it was decided to advance the price of Wire Nails to \$1.55, base, in carload lots, f.o.b. cars, Pittsburgh or

Cleveland district. From the fact that nearly all the mills are filled up with orders for the next two or three months, there seems to be little doubt that this price will be maintained, and from several quarters come intimations that within the next two or three weeks a further advance will be made. Assurances from makers warrants the statement that the Wire-Nail trade is probably in better condition to-day, both as regards demand and price, than for a long time. Even at the advanced price noted above, many concerns are utterly unable to book additional orders for delivery before July 1, as their product is entirely sold up to that date. In the Out-Nail trade an improved condition of affairs is noted, and the demand at this time is better than for some months past. Mills are adhering very closely to the new card, and, except for very large blocks, the claim is made that it is not being shaded.

Steel Rails.—The Edgar Thomson Mill continues on Rails and it is understood to have sufficient orders on hand to take its output for some little time. A material improvement in demand is expected from this time forward on account of additions to track equipment, which must be made within a short time by railroads in order to take care of their World's Fair traffic. Prices are unchanged at \$29 at mill for Standard sections.

Wire.—The very satisfactory condition of affairs in the Wire trade noted in these columns for some weeks past continues, and the situation is improving right along as far as prices are concerned. Within the past week a further advance of about \$1 per ton has taken place, and we now quote Galvanized Barb Wire at 2.60¢ in carload lots and 2.65¢ in less quantities. Painted Barb Wire is also firm and in heavy demand at 2.20¢ in carload lots and 2.25¢ in less quantities. The continued advance in prices of both Painted and Galvanized Barb Wire do not seem to affect demand any, which is as heavy to day as at any time within the past month or two. The recent advance in Plain Wire is firmly sustained, and we continue to quote Nos. 6 to 9 at 1.70¢ in carload lots and 1.75¢ in less quantities. Nos. 10 and 11 we quote at 1.80¢ @ 2¢; No. 12 at 1.90¢; No. 13 at 2¢ and No. 14 at 2.15¢.

Skelp Iron.—The market is in the same condition as noted last week, a fair demand is going, but prices are low and do not show any indication of betterment in the near future. We continue to quote Grooved at 1.50¢ @ 1.52½¢; Sheared at 1.70¢ @ 1.72½¢, four months, or 2% off for cash.

Sheets.—A heavy business is going, and the fact that makers are not willing to book orders for delivery after July 1 has naturally resulted in a rush of orders for delivery before that date, which is keeping the mills running to their utmost capacity in order to turn out product as fast as required. Prices are firm, and we quote Ordinary Box Annealed Sheets as follows: No. 24, 2.50¢ @ 2.55¢; No. 26, 2.60¢ @ 2.65¢; No. 27, 2.70¢ @ 2.75¢. As noted last week, makers are charging about \$2 per ton advance on above prices for Soft Steel Sheets, on account of the advance in price of Billets.

Scrap Iron and Steel.—A material improvement in demand for certain kinds of Scrap Material is reported, but with one or two exceptions there has been no improvement in price. We continue to quote No. 1 Railroad Wrought Scrap at \$15 per net ton; Cast Iron Borings at \$8 per gross ton; Wrought Iron Turnings \$10 per net ton. Leaf Springs are scarce and in active demand, and are bringing \$21 per gross ton; Coil Springs are in limited demand at \$18 @ \$18.25 per gross ton, while Old Car Wheels are higher and are selling at \$13.50.

Old Rails.—A fair demand is reported for Old Steel Rails, and we quote long and short lengths at \$15.50 per gross ton; mixed Rails at \$14.25 per gross ton; Iron Rails are in slow demand and are bringing \$19.50 per gross ton, f.o.b. cars Pittsburgh.

Connellsville Coke.—For the week ending March 25 there were 12,932 ovens in the Connellsville region in blast, 4395 idle, with a production for the week of 125,820 tons. Prices do not show any change, and we continue to quote Furnace Coke at \$1.60, f.o.b. cars in Connellsville region. It is claimed that \$1.50 has been named in some recent transactions. Foundry Coke is held at \$2.15 to dealers and \$2.30 to consumers.

(By Telegraph, 1 p.m., April 5.)

Pig Iron.—The market on Bessemer Pig is admirably described by the word "easy," and this applies to both demand and prices. For the week under review there were very few transactions, and these for small lots, ranging from 300 to 500 tons. As was pointed out several weeks ago, the advance in Bessemer Pig considerably strengthened the position taken by the Ore men on prices for this year, and as a result, the two large buyers of Ore have not covered their requirements. Following out this line of reasoning, it will be seen that the immediate interests of the two concerns who make more than one-fifth of all the Pig Iron made in this country will be better served by at least temporary lower prices on Bessemer Pig. At this time all conditions surrounding the market point to a decline in values for a time at least. Large consumers have their wants covered for some time, and in one case, that involves a good many thousand tons of Bessemer, furnaces have been asked to defer shipments, and some of this Iron, that will not be wanted by the concern during April and May, has been offered in the open market at prices equal to \$13.90, Pittsburgh, and less. In addition to this, every stack in Allegheny County was active in March except Soho, and, as a consequence, production was extremely heavy, running close to 175,000 tons. From this it will be seen that all conditions point to lower prices on Bessemer for a time at least. After Ore contracts are arranged it is not improbable that there will be a sudden recovery of values. While we quote Bessemer as low as \$13.75, Pittsburgh, it should be noted that the few sales reported within the last week have been at slightly higher figures. We quote as follows:

Neutral Gray Forge.....	12.25 @	.....	cash.
Au-Ore Mill.....	12.50 @	.....	"
No. 1 Foundry.....	13.75 @	14.00.	"
No. 2 Foundry.....	12.75 @	13.00.	"
Charcoal Foundry No. 1....	17.00 @	18.00.	"
Charcoal Foundry No. 2....	16.50 @	17.00.	"
Bessemer Pig.....	13.75 @	13.90.	"

We note two sales of Bessemer for April delivery, aggregating 800 tons, at \$13.90, Pittsburgh.

Billets.—The market is extremely quiet and buyers have apparently deserted the field and are content to run the risk of having to pay advanced prices when they must again enter the market. On the other hand, there is no pressure on the part of mills to seek contracts until those already in hand have been cleared up or nearly so. The peculiar conditions

surrounding the Bessemer Pig market just now are being reflected to some extent in Billets. In some quarters the impression prevails that Steel at \$23 is as high as it will go, and should any marked decline occur in Pig it will be felt in Billets also. Already reports are going of Steel being offered at \$22.75 for May and June. However, the fact that Duquesne is off and that a plant in the Wheeling district will soon close for extensive repairs should have the effect of preventing any marked decline in values.

The Penn Bridge Company, Beaver Falls, Pa., contractors and manufacturers of Bridges and Structural Material in Iron or Steel, are completing an iron mill building for the Sharon Iron Company, Limited, Sharon, Pa., and have lately been awarded a contract at Uniontown, Pa., for a bridge with 50 foot span, 32-foot roadway and two sidewalks 12 feet each. Also for bridge at West Middlesex, Pa., 185 foot span, 20-foot roadway and sidewalks. In addition to the above they have a number of small contracts on hand and are operating their works full time in all departments.

Baltimore.

BALTIMORE, April 4, 1893.

Quite a good deal of business is on the market here at present, principally Plate and Structural Material, though other classes are by no means in as bad a condition as two months ago, when sellers wondered if there would ever be a call for fair-sized lots again. Despite the indications of stiffer prices a Bar Iron order was placed during the week with a local house at a lower price than has been known of this year. Machinery Steel of various classes has dropped in price, owing to competition on some orders a little greater in magnitude than ordinary. To sum up the whole matter, it is doubtful if Iron and Steel products are being sold anywhere in the country on as small margins as they are being sold here.

Bar Iron.—We continue our quotations, although it is notorious that special orders have been placed during the past week at considerably lower prices. The business ahead seems to be fair in quantity and the mills seem to be determined to advertise for future business by making great inducements now. We quote from stock, 1.80¢ @ 2¢; from mill, 1.70¢ @ 1.80¢.

Plates.—These seem to be in the same unsettled condition as reported last week. Both the Eastern and Western mills seem to claim this city and territory and are fighting for it, with the odds in favor of the East. We quote Tank Steel and Iron, 1.80¢ @ 1.90¢; Shell, 2.15¢ @ 2.25¢; Flange, 2.30¢ @ 2.40¢; Fire Box, 2.45¢ @ 2.55¢; Marine, 2.45¢ @ 2.55¢.

Merchant Steel.—Prices on Merchant Steel are now in the condition of other products, owing, as stated above, to competition on special business. Machinery Steel is quoted 2.10¢ @ 2.25¢; Tire Steel, 2.20¢ @ 2.30¢; Spring, 2.45¢ @ 2.55¢; Toe Calk, 2.25¢ @ 2.35¢.

Tubes and Pipe.—Boiler Tubes have been active but Pipe dull. Tubes are quoted 70% all sizes on new list.

The Verein Deutscher Eisenhuettenleute has just issued a revised edition of standard specifications for iron and steel. They cover rails, steel sleepers, angle bars tires and axles, structural shapes, plates and sheets, merchant iron and steel, wire, and iron and steel castings.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, April 5, 1893.

Warrant speculations have been very tame and prices have moved irregularly, without, however, showing any radical change. Scotch moved up to 40/10½ and Hematites receded to 45/4½, the latter being in very poor demand. Cleveland has moved up to 34/6 and appears to be the favorite with some operators since merchants and consumers have manifested some disposition to increase their holdings, despite the accumulation latterly of stocks in makers' hands, on the belief that prices will improve later on. Stocks in public stores include 342,700 tons Scotch and 60,000 tons of Cleveland Iron.

There is some sign of improvement in various branches of the Steel trade, and Bolckow's Eston works are about to be restarted.

Prior to the Easter holidays, prices for Pig Tin were held firmly, but resumption of business was characterized by depression, due to advices of heavy shipments from the Straits last month and unfavorable advices from America. On Tuesday sales were made of prompts at £93. 10/, and futures at £2 @ £3. 10/ discount.

Copper prices have been quite steady, although holidays interfered with business to a greater or less extent. Demand from consumers is very conservative, however, and the undertone of the market is easier than it was a week ago.

For Tin Plate several good orders have been placed, in which Bessemer Cokes figured conspicuously at somewhat better prices. There is quite a good demand for squares and Oil sizes at prices averaging about 3d. advance on late quotations. Stocks at shipping ports amount to 215,000 boxes, against 206,000 boxes at the corresponding period last year. Output increases, however, with expansion of demand. The Hendy Works have restarted during the week.

Scotch Pig Iron.—Market for all brands is quiet and prices remain stationary.

No. 1 Coltness, f.o.b. Glasgow.....	44/
No. 1 Summerlee, " ".....	49.6
No. 1 Gartsherrie, " ".....	47.6
No. 1 Langloan, " ".....	43/
No. 1 Carnbroe, " ".....	43/6
No. 1 Shotts, " at Leith.....	53/
No. 1 Gtengarnock, " Ardrossan.....	48.6
No. 1 Dalmellington, " ".....	46.6
No. 1 Eglinton, " ".....	44/

Steamer freights, Glasgow to New York, 2 6; Liverpool to New York, 7/6.

Cleveland Pig.—Only moderate business, but prices firmer at 34/6, f.o.b. shipping port, for No. 3 Middlesborough.

Bessemer Pig.—Warrants improved to 46/ at the close, but makers are free sellers at 47/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Ferromanganese.—Demand moderate, but prices quite firm. English 80 % quoted at £10. 15/, f.o.b. shipping port.

Steel Rails.—A moderate business passing and prices barely steady. Heavy sections quoted at £4, f.o.b. shipping port.

Steel Slabs.—Market continues very quiet and prices are without change, but rather soft. Bessemer quoted at £4, f.o.b. at shipping point.

Steel Billets.—Demand is moderate and the business passing is chiefly at old prices. Bessemer, 2½ x 2½ inches, quoted at £4. 2/6, f.o.b. shipping point.

Steel Blooms.—Market very quiet and without change. Makers quote £4 for 7 x 7, f.o.b. shipping point.

Old Iron Rails.—A moderate business passing at about former prices. Tees quoted at £2. 7/6 @ £2. 10/ and Double Heads at £2. 10/ @ £2. 12/6, f.o.b.

Scrap Iron.—Demand moderate, but prices quite steady. Heavy Wrought Iron quoted at £2, f.o.b.

Crop Ends.—Little doing and prices nominal. Bessemer quoted at £2. 7/6 @ £2. 10/, f.o.b.

Manufactured Iron.—Orders continue moderate numerically, and are chiefly for small quantities. Prices rather soft, but show no radical change. We quote, f.o.b. Liverpool:

Staff. Ordinary Marked Bars	£ s. d.	£ s. d.
" Common ".....	8 0 0 @	6 7 6
Staff. Bl'k Sheet, singles....	7 7 6 @	7 10 0
Welsh Bars (f.o.b. Wales)....	5 7 6 @	5 10 0

Tin Plate.—Market closes quiet, but offerings are reserved and prices quite firm. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade.....	13/6 @ 14/0
IC Bessemer Steel, Coke finish.....	12/0 @ 12/3
IC Siemens " ".....	12/3 @ 12/6
IC Coke, B. V. grade 14 x 20.....	12/0 @
Charcoal Terne, Dean grade.....	13.6 @ 14

Pig Tin.—Market dull at the close, but steady. Straits quoted at £93. 15/ for spot and £91 nominal for three months' futures.

Copper.—Market closes quiet and easy. Merchant Bars quoted at £45. 2/6, spot, and £45. 12/6, three months' futures. Best selected, £49. 10/.

Lead.—The market has remained quiet and prices steady at £9. 15/ for Soft Spanish.

Spelter.—Demand moderate, but prices firmer at £17. 10/ for ordinary Silesian.

The German Iron Trade.

(One mark per metric ton is equivalent to 24.8 cents per gross ton.)

DUSSELDORF, March 18, 1893.

The slight improvement which begun to be felt recently has continued, and has made some progress. For high grade Mill Iron and Thomas Pig from 36.12¢ to 48.16¢ per ton more is realized, while Foundry Iron and Bessemer Pig retain their former level, which, it is true, has for some time past been relatively higher. Prices for partly manufactured articles have made more progress, and Steel Ingots are not now available under \$17.85, while Billets have risen to \$18.35 @ \$18.84 and Slabs to \$19.34 @ \$19.84. Scrap has risen considerably in consequence of a strong demand from Open-Hearth plants, \$13.64 now being quoted for best assortment. Latterly Open-Hearth melters have turned their attention to Low Silicon and Low Manganese Pig Iron, which is growing in favor as a substitute for Scrap.

Imported Ores are low in consequence of the depressed freight market, but Sie-

gen Spathic Ores and Puddle Cinder have risen considerably. The latter is quoted \$37.20 per car of 10 tons. In Bars business is decidedly active, and Wrought Iron is now quoted \$27.77 @ \$29.02, while Soft Steel Bars are \$26.78 @ \$27.77. Plate makers are getting more orders, but prices are still very low. The Styrum Rolling Mill, which stopped operations half a year ago, intends to resume plate mill rolling at an outlay of \$62,000. There is quite an active demand for Beams and other Structural Shapes, but prices are rising very slowly. For Track Material the requirements of the Baden and Prussian State railroads have been closed at lower figures than those of a year since. The lowest offer for 24,000 tons for the former was \$28.74 by S'umm Brothers. The firm of F. Krupp, at Essen, have taken 2550 tons of Steel Rails for the Dutch line Herzogenrath Eincheoven, at 58 florins 40 centimes, delivery Amsterdam.

The Effect of Melting Pig Iron.—The Valentine Iron Company of Bellefonte, Pa., have just issued the first number of a small publication called the *Nittany Bulletin*, which deals with their Nittany brand of foundry iron. From it we glean the following chemical data bearing on a recent experiment made by them to show the chemical change which takes place in the cupola. The following table shows the change in the chemical composition of iron as the result of remelting, the analysis given being that of the pig iron and of the resulting castings, one a heavy piece of machinery and the other a thin plate 1½ inch in diameter:

	Pig iron.	Large casting.	Small casting.
Silicon	2.680	2.610	2.380
Graphitic carbon.....	3.140	3.420	2.980
Combined carbon.....	0.740	0.100	0.430
Manganese.....	0.644	0.397	0.490
Phosphorus.....	0.508	0.530	0.502
Sulphur.....	0.041	0.089	0.087
Iron.....	92.230	92.850	93.130

The melt was made with a 48-hour coke having 1.46 per cent. of sulphur, which explains the increase in the sulphur contents in the casting.

New South Wales, Australia, is sadly in want of an able financier to straighten out the pecuniary muddle in which the Government appears to be floundering. The condition of the colony, regarded in the light of property, leaves little to be desired. But she is saddled with a public debt of \$260,000,000, and, notwithstanding the splendid security she has to offer in public assets, including unsold lands and productive works estimated at nearly \$910,000,000, she finds it a hard matter to borrow money for present needs. Her population is increasing, having risen from 782,030 in 1881 to 1,132,324 in 1891, and her revenue has increased proportionately in the same ten years, namely from \$32,250,000 to \$48,000,000. The exports of domestic produce have advanced from \$57,580,000 in 1881 to \$101,300,000 in 1891; while the increase in total trade, intercolonial and external, is no less remarkable, having advanced from \$158,400,000 to \$232,000,000. Moreover, the present value of private estate in the colony is assessed at nearly \$2,000,000,000. The reason given for the hesitation of foreign capitalists to advance money to the New South Wales Government is distrust of their financial methods and fear of the labor party, which is not unlikely to succeed to the control of the trade and industry of the colony.

A manual training school is to be established in Detroit similar to schools in Toledo and Springfield, Ohio, under the management of the Y. M. C. A. Detroit already has 200 young men studying in the mechanical branches.

HARDWARE.

Condition of Trade.

REPORTS of the amount of goods distributed by the trade in all parts of the country continue good. Large quantities are now going into consumption everywhere. Indeed, many lines are moving off so rapidly that it is difficult to get orders promptly filled. This is particularly true in the case of seasonable goods. Manufacturers generally report a good volume of business, and very many are behind their orders. Collections, except in some localities, are fairly good.

Chicago.

(By Telegraph.)

The demand for Hardware is increasing steadily. Jobbers anticipate a very heavy April trade, looking for a great deal of business which is usually done in March, but which was checked this year on account of the prolongation of winter weather. Spring appears to have opened to stay, as over a week of mildness has now been experienced through the Northwest. The improved weather has brought with it a much better demand for Tin Plates, especially for ternes, as the construction of buildings is being vigorously pushed. Wire Cloth is exceedingly scarce, and is now held by jobbers at \$1.40, with an advancing tendency. Stocks in Chicago are reported to be hardly equal to the wants of the city itself. The multitude of structures of all kinds now nearing completion on the World's Fair grounds and in the immediate vicinity has caused a very heavy demand for finishing Hardware, and many contractors are in straits because they cannot get supplies which they have deferred buying until they were actually needed.

St. Louis.

(By Telegraph.)

The demand for Shelf Hardware is on the increase, and jobbers report good quantities included in nearly every order received. In the line of Garden Tools and Agricultural Implements a steady demand is noted, and heavy orders are received for hot-weather goods. The pleasant weather prevailing for the past week has shown its beneficial effects on the size of country orders now being received. The Southern trade is in excellent shape and promises to be large. Wire Nails and Barb Wire are in heavy demand and prices are fairly well maintained. Copper goods, Tin Plate and Builders' Hardware are moving in large volume and prices are firmer in consequence.

Louisville.

W. B. BELKNAP & Co.—Almost every mail brings us in notice of slight advances in some line of manufactured goods or in Wire and Steel products. The demand for Plain and Barbed Wire and Wire Nails is well kept up, incidental

to the fine weather of spring and the widespread building operations projected and in process.

It really looks at last as though the mills had gathered a little nerve to take advantage of the market conditions for realizing better profits.

Buying movement has been active, and large orders placed for Iron, Sheet, Wire and Staples generally, the prices of which are recognized to be necessarily near bottom.

The low price of wheat and flour is a little staggering to our farmers and millers, but the idea prevails that there will be some good use for wheat, even if more or less of it has to be fed to the hogs, as we hear is the case in the far West.

The money market has been working rather tight here, incident to the failure of a large bank in Nashville (which, however, was brought on by palpable speculations and such practices as would break any institution, if we understand them aright); also locally by the discovery of the use, by one firm here, of a quantity of forged warehouse receipts for whiskey. The banks have been badly bitten here for the fifth time, according to those who keep tally. It is only reasonable to expect that the process will continue periodically until somebody is punished, and punished severely. In the other cases, all or nearly all, have been pardoned, the indictments dismissed, and the offenders permitted to come back and move in the social and business circles without prejudice. What is necessary for the prevention of this sort of crime in any community is a little less blind credulity on the part of the bank and decidedly more prompt and persistent punishment on the part of the Commonwealth.

Baltimore.

CARLIN & FULTON.—Though orders from the cotton States have, as usual at this time of the year, greatly diminished and are confined generally to the leading staples, we are glad to report an active trade from all other sections.

In our own city it is wonderful to see what an effect the present favorable weather has had on all outdoor work, and just now every contractor is pushing with the greatest vigor the construction of the great enterprises of the Belt Railroad, and immense sums of money are being expended in the transformation of nearly every street car line into modes of rapid transit, some by cable, others by electricity, which, with the expenditure of \$6,000,000 by the city in repaving the streets, building bridges and other works of municipal necessity, makes a most busy city.

So far little has been heard from the peach grower, who yearly laments the early demise of his crop, and consequently we infer that there will be an abundance this year of fruit of all kinds, in anticipation of which porcelain-lined Preserving Kettles have advanced in price.

The severe weather of the winter just

ended having enabled nearly every one to harvest a large ice crop will cause in the opinion of all an extraordinary demand for both Freezers and Refrigerators, and it is to be hoped that the retail dealers throughout the country will not wait until the last minute to supply this certain demand.

Wire Nails and Barb Wire have both sympathized with the state of trade in their lines and advanced in price. At this time of the year it seems that nearly every house needs the services of an actuary or a competent mathematician, for nearly every mail has a number of inquiries from the individual who wants "an estimate" either to fence in a graveyard, or to build a poultry fence, or to inclose a farm with Barb Wire of a specified number of strands and a certain number of miles in length.

It is really wonderful when we think of the infinite number of calculations in weights and sizes which the Hardware business is compelled to furnish.

Collections are generally fair and we suppose are up to the average of a year ago.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—The First of April brings us down close to seeding time, and before this reaches your readers in the Northwest it is probable that the farmers will be already busily engaged in putting in their crops.

From winter to spring is a rapid transition with us. One day the air sharp and wintry, and a day or two later the sun shining warm, the air mellow and the farmers busy in their fields seeding.

The past month was notable for its storms and the severity of the weather, and the agriculturalists have been hibernating to an unusual degree for the season, but the roads generally are not yet in a fairly passable condition.

This has affected trade in all lines, and the volume of business in the Northwest for the first quarter of the year has not equaled that of last year, although it has not fallen short of the expectations of conservative business men.

A very fair trade is expected from now on. Stocks in the hands of retailers are not large, and dealers have been adhering closely to the policy of buying only for actual wants.

In carrying out this policy frequent and small orders have been necessary, so that the decrease in the volume of business has been exhibited in the size and not in the number of orders received.

In this state of things orders will now necessarily be larger, as well as more frequent than would be received if the earlier orders had been larger and the dealers were stocked up for the early summer trade.

Prices continue largely without important change. Nails have been advanced, and a little firmer tone on Wire is to be noticed. Collections will improve greatly after seeding.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Trade continues active, regardless of local complaints of bad roads and consequent poor collections.

The frequent letters urging forward season goods that were booked to go at a later date indicate an early opening of spring, when Garden Tools will be needed.

The season opens with rather a scarcity than otherwise of these goods, and local manufacturers are without any overstock. Manufacturers of these goods, in recent years, have confined their production chiefly to orders that have been booked for later delivery, and depend but little upon transient orders, giving as their excuse that the present profit on their production, together with the warehousing required, will not guarantee any other plan; but should spring open as suddenly as now predicted there must necessarily be some disappointment to the trade who held off buying these goods until the last moment.

Wire Nails are in active demand at slightly advanced rates. Barb Wire remains firm at former quotations, with every appearance of a heavy spring trade on both the above articles.

Salesmen report no overstock of goods in hands of customers.

Collections may be considered below the average.

Shipments of merchandise have taxed the capacity of the railroads leaving our city, and considerable complaint is made from customers, owing to delay. Prospect of spring trade continues bright.

Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—In its general features this market presents no changes of importance. There is a constant, steady demand for goods both from the agricultural and mining districts which aggregates a very respectable volume, so that jobbers are well satisfied with the present conditions as well as the future outlook. A cheerful tone characterizes the reports received from the interior, and prospects are generally referred to as bright and encouraging. Enterprise and progress will show a marked development during the coming months, evidences of which are daily appearing. Labor, as a rule, is well employed, and will be still more in demand as soon as the weather will permit of the resumption of building and other warm weather enterprises. Referring to city trade, the movement of goods in a retail way is not quite all that could be desired, but it is almost too early in the season to look for any great improvement. Collections on the whole may be reported as fair, with an easy money market.

Cleveland.

THE W. BINGHAM COMPANY.—While business for March can be recorded as good there is still room for improvement. The weather so far has not been conducive to brisk trade. Prices on staples are moving upward.

At a meeting of the Wire Nail manufacturers held here on Thursday the price was advanced 5 cents per keg. Wire of all kinds has also advanced \$2 per ton with

probabilities of a still further rise, as all the mills are behind on their orders.

Retailers in this city report trade as good, Builders' Hardware being in unusual demand.

We are sorry to report collections as poor, owing probably to the bad condition of the country roads.

Boston.

BIGELOW & DOWSE.—There is a marked improvement in general business the past two weeks. The season is about two weeks behind, but the snow has disappeared and mild weather is having a beneficial effect. Retail dealers report a good demand for general Hardware, and their orders are well assorted:

The demand for both Wire and Cut Nails is very high, and much beyond that of previous years. Buyers seem to take no notice of the late advances made by Wire-Nail manufacturers, and are not inclined to buy in advance of their wants. The nominal price for Wire Nails for stock is \$1.80, base, this price being shaded on orders shipped direct from factory. If the late advance of \$2 per ton on Steel Slabs is maintained, Steel Cut Nails must advance. The present price from store is \$1.50, base.

The manufacturers of some of the favorite makes of Bicycles are far behind their orders, which is causing great annoyance to customers, who are anxious to have their wheels at once. The demand for high-grade machines is much greater than ever before. A line of Bicycle sundries is quite a necessary addition to a stock of Hardware, and pay a good profit to the retailers.

Everything looks favorable for a large trade in April and May.

New Orleans.

A. BALDWIN & Co.—Business still continues fairly active, especially in the builders' line. Orders are coming in much more freely than we anticipated, and the steady improvement in the building line in New Orleans is causing a considerable increase in the demand for Builders' Hardware.

Trade in Texas and Mexico is somewhat more quiet than it has been for the past 60 days. The planters are very busy in their line, and the volume of business is apt to fall off somewhat for the next 60 days.

Notes on Prices.

Cut Nails—The demand for Cut Nails is being maintained extremely well, mills still quoting very generally \$1.20 for carload lots at mill, although this price has been shaded in some instances. In New York the quotation is \$1.40 for carload lots on dock and \$1.60 from store.

Chicago, by Telegraph.—Cut Steel Nails are slightly lower from factory, in sympathy with lower prices circulated by Wheeling makers, and can now be quoted at \$1.35, Chicago. Manufacturers here are well supplied with orders for this month, but have deemed it wise to meet changing conditions elsewhere. Small lots from stock are selling at \$1.50.

Wire Nails.—The manufacturers of Wire Nails held a meeting last week, at which it was decided to make an advance in the card rate to \$1.55 f.o.b. at mill, with Cleveland as the point of equalization for the West and Pittsburgh for the East. This advance is smaller than was looked for at this time, and in view of the exceptionally strong position of this article it is not unlikely that another advance will be made before long. The demand continues very large. Small lots from store in New York are quoted at \$1.80 to \$1.85.

Chicago, by Telegraph.—The Wire Nail manufacturers held a meeting in Cleveland last Thursday and advanced prices to \$1.55, Cleveland and Pittsburgh. Reports made at the meeting showed an aggregate stock of only 100,000 kegs with contracts booked for over 400,000 and a good demand still coming in from large buyers. Conditions have seldom been so strongly in favor of the manufacturers. The advance made was very conservative under the circumstances. Reduced freight rates make the factory price equal to \$1.67, Chicago, or only 3 cents advance. Another advance, however, is probable in the near future. Jobbers met on Monday and raised their prices to \$1.75 for small lots and \$1.70 for carloads. Those who persistently parted with their stock at very low prices, in competition with the manufacturers, now see the mistake they made.

Barb Wire.—The demand for Barb Wire continues good, and while there is no quotable change in prices a hardening tendency is noticed. We quote \$2.45 @ \$2.50 for Four Point Galvanized, in carload lots at mill. In New York the price is \$2.65 @ \$2.70 for carload lots on dock, and \$2.70 @ \$2.75 at store.

Chicago, by Telegraph.—Barb Wire is in much stronger demand as the spring opens, and manufacturers expect shortly to have more business than they can well handle. Inquiries are coming in from all sections. Factory quotations are unchanged at \$2.20 for painted and \$2.60 galvanized, but it will not take much of an addition to the demand to push prices up. Jobbers quote small lots from stock at \$2.30 and \$2.70 respectively.

Rope.—During the past few days the fiber market has shown exceptional weakness. This is especially the case with Sisal, and, though it has had as yet no appreciable effect on manufactured goods, it is thought that it may have very soon. New Zealand is of course in sympathy with Sisal, and should a decline in the latter be maintained New Zealand must follow. Quotations on Rope have so far been well maintained, and we have no change to note at the present writing.

Screws.—There are indications of a disposition on the part of some manufacturers of Wood Screws to be aggressive in seeking new customers, to whom they are offering unusual terms. This has caused a weakness in prices, and quotations are being made in some cases which are lower than any during the past few months.

Dickson Transom Lifters and Openers.

—These goods, a description of which appeared in our issue March 30, are put on the market by the G. J. Dickson Mfg. Company, Albany, N. Y., W. H. Eckert, 18 Warren street, New York, agent. The self-locking Transom Opener is sold at the following list, subject to a discount of 30 per cent.:

Bronzed Iron.

Diameter of rod.	Length of rod.	Length of arm.	Price each.	For extra length of rod per foot.	For extra length of arm per foot.
Inch.	Feet.	Feet.		Cents.	Cents.
$\frac{3}{8}$	2	1	\$2.00	20	15
$\frac{1}{2}$	2	1	2.75	30	20
$\frac{3}{4}$	2	1	3.50	40	20

Nickel, brass, bronze and ebony plated, 70 per cent. more than bronzed iron.

Solid Bronze, Highly Polished.

Diameter of rod.	Length of rod.	Length of arm.	Price each.	For extra length of rod per foot.	For extra length of arm per foot.
Inch.	Feet.	Feet.		Cents.	Cents.
$\frac{3}{8}$	2	1	\$5.00	55	40
$\frac{1}{2}$	2	1	6.50	75	55
$\frac{3}{4}$	2	1	8.00	\$1.00	55

Solid brass, same price as bronze.
Old copper, antique bronze and antique brass, 20 per cent. more than bronze.
Oxidized silver, 50 per cent. more than bronze.

The Champion and Premier Transom Lifters, the Dickson Casement Adjuster and Springs for Transom Lifters are sold at a discount of 60 per cent. from the following lists:

Champion Transom Lifter.

Length.*	Diameter.	Bronzed iron.		Nickel plated.	
		Price each.	Extra length.	Price each.	Extra length.
Feet.	Inch.				
3	$\frac{3}{4}$	\$0.60	10 cents	\$2.30	30 cents
4	$\frac{3}{4}$	.70	a foot.	2.60	a foot.
5	$\frac{3}{4}$	.80		2.90	
3	5-16	.95	15 cents	3.30	45 cents
4	5-16	1.10	a foot.	3.75	a foot.
5	5-16	1.25		4.20	
6	$\frac{3}{8}$	1.40		4.50	
4	$\frac{3}{8}$	1.50	20 cents	4.80	60 cents
5	$\frac{3}{8}$	1.70	a foot.	5.10	a foot.
6	$\frac{3}{8}$	1.90		5.70	
7	$\frac{3}{8}$	2.10		6.30	
8	$\frac{3}{8}$	2.55	30 cents	7.65	90 cents
6	$\frac{1}{2}$	2.85	a foot.	8.55	a foot.
7	$\frac{1}{2}$	3.15		9.45	

Solid Bronze Lifters, Highly Polished.

Length.*	Diameter.	Price each.	Extra length.
Feet.	Inch.		
3	$\frac{3}{4}$	\$3.00	40 cents a foot.
4	$\frac{3}{4}$	3.40	
5	$\frac{3}{4}$	3.80	
3	5-16	3.80	60 cents a foot.
4	5-16	4.40	
5	5-16	5.00	
6	5-16	5.60	
4	$\frac{3}{8}$	5.20	80 cents a foot.
5	$\frac{3}{8}$	6.00	
6	$\frac{3}{8}$	6.80	
7	$\frac{3}{8}$	7.60	
8	$\frac{3}{8}$	8.40	
6	$\frac{1}{2}$	10.20	\$1.20 a foot.
7	$\frac{1}{2}$	11.40	
8	$\frac{1}{2}$	12.60	

* Combined length of lifting rod and arm.
Bronze plated, brass plated and ebony plated, same price as nickel plated.
Solid brass, same price as solid bronze.
Antique bronze or brass and old copper, 10 per cent. more than solid bronze.
Oxidized silver, 25 per cent. more than solid bronze.

Premier Transom Lifter.

Length.	Diameter.	Nickel plated.		Solid bronze.	
		Price each.	Extra length.	Price each.	Extra length.
Feet.	Inch.				
3	5-16	\$4.35	45 cents	\$5.30	60 cents
4	5-16	4.60	a foot.	5.90	a foot.
5	5-16	5.25		6.50	
6	5-16	5.70		7.10	
4	$\frac{3}{8}$	5.40		6.70	
5	$\frac{3}{8}$	6.00	60 cents	7.50	80 cents
6	$\frac{3}{8}$	6.60	a foot.	8.30	a foot.
7	$\frac{3}{8}$	7.20		9.10	
8	$\frac{3}{8}$	7.80		9.90	
6	$\frac{1}{2}$	9.15	90 cents	11.70	\$1.20
7	$\frac{1}{2}$	10.05	a foot.	12.90	a foot.
8	$\frac{1}{2}$	10.95		14.10	

* Combined length of lifting rod and arm.
Bronze plated, brass plated and ebony plated, same price as nickel plated.
Solid brass, same price as solid bronze.
Antique bronze or brass and old copper, 10 per cent. more than solid bronze.
Oxidized silver, 25 per cent. more than solid bronze.

The Dickson Casement Adjuster.

Finish.	Diameter.	Length.	Price each.	For extra length, per inch.
	Inch.	Inches.		
Bronzed iron..	5-16	10	\$0.60	\$0.05
	$\frac{3}{8}$	10	.75	.06
	$\frac{1}{2}$	10	1.00	.08
Nickel plate..	5-16	10	1.00	.08
	$\frac{3}{8}$	10	1.20	.10
	$\frac{1}{2}$	10	1.60	.14
Solid Bronze..	5-16	10	1.30	.11
	$\frac{3}{8}$	10	1.60	.14
	$\frac{1}{2}$	10	2.25	.20

Springs for Transom Lifters.

Size of rod.	Bronzed.	Plated, any finish.
	Each.	Each.
$\frac{1}{4}$	\$0.12	\$0.24
5-16 .....	.15	.30
$\frac{3}{8}$ .....	.18	.36
$\frac{1}{2}$ .....	.20	.40

Discount Sheet.—The Barnes Mfg.

Company, Phoenix, N. Y., issue the following discount sheet, which applies to their 1893 catalogue and price-list. Terms, 30 days, f.o.b. factory:

	Discount.
	Per cent.
Phoenix Vises: All styles and sizes, including Case Assortments, Sample Blocks and Combination Pipe Jaws.....	33 $\frac{1}{2}$
Pipe Vises	33 $\frac{1}{2}$
Reinforced Bronze Metal Sash Chain.....	60&10
Reinforced Steel Sash Chain, either bright or copper finish.....	60&10&10
Victor Bronze Sash Chain.....	.65
Victor Steel Sash Chain, either bright or copper finish.....	65&10
Sash Chain Fixtures.....	60
Plumbers' Chains—12 yard boxes or 500 feet reels.....	New List 60
Basin, Wash Tray and Bathtub Chains.....	
Brass Split Links.....	
Brass Eight Hooks.....	
Lathe Dogs and Lathe Dog Wrench.....	50&10
Steel Machinists' Clamps.....	33 $\frac{1}{2}$
Door Springs.....	33 $\frac{1}{2}$
Door Stop and Holder.....	33 $\frac{1}{2}$
Door Checks.....	33 $\frac{1}{2}$
Barrel Trucks.....	40
Bench Anvils.....	50
Christmas Tree Holders.....	50
No. 1 Carpet Stretchers.....	40
Cork Presser.....	40
Mail Box No. 1, with or without locks.....	33 $\frac{1}{2}$
File Cards.....	33 $\frac{1}{2}$
No. O Tack Hammers.....	40
Window Cleaners.....	40
Floor Scrubbers.....	50
Locking Chains.....	33 $\frac{1}{2}$
Dog Leaders.....	40
Key Chains.....	40

The company issue under date March 9 a revised price-list of their Phoenix Plumbers' and Sash Chain.

Bright Wire Goods.—Prices in this line are irregular and competition is very sharp, resulting in lower quotations than have ever before been made.

Augers and Bits.—While manufacturers seem to be adhering strictly to their prices for Augers and Bits, many of the leading jobbers of the country show a disposition to undersell the manufacturers, and are quoting prices lower than the makers will sell at.

Shedder, Mane Comb and Sweat Scraper.—This article, which is manufactured by F. E. Kohler & Co., Canton, Ohio, and was described in last week's issue, is sold to the trade at \$1.50 per dozen and \$15 per gross.

Monarch Trouser Guard.—A description of this article appeared in a recent issue. The Guard is put on the market by the Monarch Cycle Company, 42-52 North Halsted street, Chicago. It is sold to the trade at 75 cents per dozen.

Glass.—The local demand for Glass has shown no increase since our report last week, and while there is a moderate amount of Glass being sold, trade is far from being considered good. Factories continue to report no accumulation of desirable sizes in stock, with an increasing demand for their output. The capacity for producing American Glass at the present time is said to be the largest in the history of the Glass business in this country, the capacity now being equivalent to 1712 pots. Indications point to an increase in this number for next season. As this increase will largely arise from established concerns enlarging their plants, it would appear that makers familiar with the Glass business considered the outlook favorable for such extensions. Prices of American Glass remain unchanged as quoted. A committee from the National Window Glass Company held a conference on April 4 at Philadelphia with the New Jersey Glass manufacturers, with a view to getting them in the association, and the committee were expected to meet the New York importers of Glass in this city on the day following to come to some similar agreement with them. The New York French Window Glass Association agreed upon an advance in prices, to take effect April 3. The discount now in force is 75 and 10 and 5 per cent. from the French list. While no official announcement has been made as to the plan adopted by which it is hoped to sustain prices, it is understood that a sum has been paid by each firm to the association which will be considered forfeited should prices be cut by any concern. The Plate Glass trade remains unchanged, the price and demand being satisfactory. The outlook for all branches of the Glass business is considered by those in the trade as encouraging, and the demand is expected to increase in the near future. We quote prices as follows: American Window Glass, 2000 boxes at one time, 80 and 10 and 10 per cent. discount; carloads, 400 boxes, 80 and 15 per cent. discount; less quantities than carloads, 80 and 10 per cent. discount. Freight allowed on car lots and

over, not to exceed $17\frac{1}{2}$ cents per 100 pounds; less than car lots, f.o.b. at shipping point. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 60 and $2\frac{1}{2}$ per cent. discount to 60 and 5 per cent. discount. Imported Plate Glass, 60 per cent. discount to 60 and 10 and 5 per cent. discount.

Export Notes.

SIR RODERICK W. CAMERON of the well known Australian shipping firm R. W. Cameron & Co., 21 South William street, in this city, expects to leave Adelaide, South Australia, April 12, on the Peninsular and Oriental steamer "Oceana" for London, via the Suez Canal. It will be remembered that Sir Roderick and W. H. Douglas of Arkell & Douglas, who arrived back February 25, were fellow voyagers from San Francisco early in October last.

Mexican banks have recently pressed borrowers, resulting in several large failures of a speculative nature, although bank managers state that the mercantile community generally is entirely solvent. The great premium on foreign exchange caused by the depreciation of silver has resulted in diminishing importations of goods from Europe, whence is drawn the greater portion of such merchandise as competes with native manufactures, including cotton textiles and paper. In this way the Government finds the customs collections affected by what is in point of fact a decrease in tariff never contemplated when the tariff was last revised.

Some conception of the traffic carried on in refrigerated meat between New Zealand and Great Britain may be gathered from the following figures: For the last half of 1892, 32,180,583 pounds of mutton, 687,002 pounds of lamb, and 890,134 pounds of beef were shipped for this trade. For the whole of 1892 the figures are: Mutton, 80,585,750 pounds; lamb, 10,975,799 pounds, and beef, 6,075,008 pounds. In 1891 the export from the colonies was still larger, amounting to 86,282,935 pounds of mutton, 12,068,308 pounds of lamb, and 11,847,839 pounds of beef.

The foreign trade returns of the Argentine Republic for the last year show merchandise imports valued at, gold, \$91,400,000, and exports at \$112,700,000. Compared with the previous year this is an increase of 36 per cent. in imports and 13 per cent. in exports. The customs revenue amounted to, gold, \$92,200,000, an increase of 75 per cent. over 1891. The total trade with the United States amounted to \$12,200,000, against \$7,600,000 in 1891; with Great Britain, to \$55,000,000, against \$45,100,000.

The State Department at Washington is advised that the Prefect of Ting, Chiang and Laig, adjoining the island of Amoy, China, has issued a proclamation prohibiting the sale or use of kerosene oil by his subjects. As the trade in this oil is almost wholly American, Dr. Bedloe,

United States Consul at Amoy, protested vigorously against the proclamation on the ground that it violated treaty rights, and demanded its withdrawal.

Crop reports received by the Government of the Argentine Republic show that while drought prevails in some districts, the general condition of the wheat crop is excellent.

In connection with the proposed improvement of the Mexican Navy the establishment of a Government dockyard is being considered. An officer detailed several months ago to make a survey of the Pacific Coast for a location has visited Mazatlan, Acapulco and other points, including Guaymas. In his official report it is said he will recommend the latter port.

United States Minister Ryan, in Mexico, supplementing his dispatch of March 15, gives the following details of the decree of the Mexican Government admitting certain cereals into Mexico duty free: From March 15, 1893, corn (in grain and in flour) and beans, imported through the maritime and frontier custom houses of the Republic, shall be exempt from the payment of import duties under conditions and terms identical with those of the decree of June 18, 1892, which was issued because of the failure of the cereal crop and consequent advance in bread-stuffs.

Recent advices from the City of Mexico call attention to a coal famine at Mazatlan, the principal port of Mexico on the Pacific Coast. It is stated that many manufacturers have been compelled to shut down for lack of fuel.

U. D. Eddy, vice-president of the Coombs, Crosby & Eddy Company, who went to Chicago early in March to make final arrangements for the inauguration of a headquarters where their foreign clients visiting the Exposition could be entertained and directed, was taken seriously ill on his arrival. Erysipelas developed, confining him to his room for three weeks, until late in March, when C. A. Coombs of the same company went to Chicago for the purpose of accompanying him back to New York, where they arrived late last week.

Obituary.

N. H. VAN WINKLE.

N. H. Van Winkle, while at dinner Friday evening, March 17th, was suddenly stricken with apoplexy, resulting fatally the next day. Two years ago he had a slight attack of paralysis which affected his right side, but was not considered very serious, although he laid aside his business and made a trip to Europe, remaining, however, but about four weeks. In January, 1884, he formed a copartnership with William H. Miller under the firm name of Miller & Van Winkle, for the manufacture of Steel Wire and Steel Springs, their factory being at the corner of Bridge and John streets, Brooklyn. Mr. Van Winkle was known among his business associates as a genial gentleman of sterling worth, and he will be much missed. He leaves two sons, both grown, his wife having died 18 months ago. His funeral was conducted by Eastern Star Lodge 227 of Brooklyn, of

which he was a member. The business will go on uninterruptedly under the same firm name.

GEORGE L. HOWELL.

George L. Howell, a Hardware merchant of Dixon, Ill., died on March 23, in the seventy-third year of his age. Mr. Howell was born in Tully, Onondaga County, N. Y., August 24, 1820. Mr. Howell removed to Illinois and settled in Dixon in 1853. The following year he formed a copartnership with P. M. Alexander in the Hardware business, which was continued up to Mr. Howell's decease. For a long time Mr. Howell has been a patient sufferer, first with rheumatism, then with slowly developing consumption, which finally carried him to the grave.

Trade Items.

THE WILLER MFG. COMPANY of Milwaukee, Wis., are well known in the Hardware and building trades for the Sliding Blinds, Folding Blinds, Venetian Blinds, Window Screens, and Screen Doors that they manufacture. So widely are these goods known that the name "Willer" has a special value in this line of trade. The company are now suffering from some of the effects of building up a good name and a wide reputation. Unauthorized Canadian manufacturers have appropriated the same name and advertise that they are manufacturers of the Willer goods, which they offer in competition with the American article. Upon a thorough investigation of the subject it has been found that the Willer Mfg. Company have no legal redress. The Canadian patent laws are such that the American manufacturer is powerless. His patent rights, designs and trade-marks can be stolen indiscriminately by the Canadians. This may be new to many American manufacturers and may lead them to inquire as to what extent their productions are appropriated, and thus bring about some remedy through governmental intervention. It is exceedingly vexatious to find not only one's ideas but even his name stolen.

THE LANGSTAFF HARDWARE COMPANY, Memphis, Tenn., gave a dinner to their employees on the 11th ult. in recognition of their faithful attention to duties and as an evidence of the company's appreciation. It was well attended and highly successful, and doubtless served to increase the good feeling which already exists between the company and their employees.

THE LARGE ESTABLISHMENT of Phillips & Co., Niagara Falls, N. Y., was recently damaged by fire, which started among the oil cans situated in the back of the store. Here the fire was, however, confined, and the front of the store was damaged only by smoke. Although much inflammable material was in the building, the fire was quickly subdued, the employees having had presence of mind to shut up the doors, thus diminishing draft and helping to smother the flames. The loss as adjusted by the insurance companies was \$2265. Referring to the matter of insurance, the firm make the following remarks, which will probably be of interest to the trade: "The insurance adjusters acted very fairly. We came together in a very short time on all the different points as to damaged goods. So far as the goods reported lost were concerned, no question whatever was made either as to quantity or value. The most damage, of course, was from goods on hand damaged by water. This, of course, does not agree with the general statement of people having losses to adjust with insurance companies; but we are inclined to think that if people understood their business and knew what their stock was worth, and asked only a fair price upon the valuation of damages, they would have no trouble with the majority of insurance adjusters. One thing which we

found the insurance men appreciated was the fact that a lot of this stock which we thought might deteriorate by standing in a wet condition was taken down by us within half an hour after the fire took place, the wet paper torn off and the goods rubbed up and wrapped in new paper. This applied to a great many of the goods. After one of the adjusters had been here and looked over the stock, he said that we might go ahead and clear it up. By the time all the adjusters got here the damaged goods had been got out, the dirt cleared away, and they were thus enabled to get at the amount of value of the different goods very rapidly. One of them spoke of this, and seemed to appreciate it; and we are inclined to think that if people would take more pains in this respect there would be less fault found with the insurance people. This is the fourth loss we have had inside of eight years. The first loss, eight years ago, was \$4500, the others being minor losses. We must say that we have always found the insurance people perfectly willing to give us everything that was fair."

A. N. STEIN HARDWARE COMPANY, 35 Warren street, New York, have been appointed agents for the sale of the Solid Steel Spiders and Griddles, manufactured by the Cleveland Stamping & Tool Company of Cleveland, Ohio.

THE PARTNERSHIP heretofore existing under the name of Kimball & Dunbar, dealers in Hardware, &c., Oneida, N. Y., has been dissolved by mutual consent, the interest having been sold out to Seth Dunbar of Baldwinsville. Mr. Kimball is authorized to settle all the affairs of the late firm. He will also act as manager for the purchaser in the new firm.

THE INDIANA BICYCLE COMPANY, Indianapolis, Ind., in their advertisement on another page of this issue, illustrate the Waverly, which they are putting on the market. It is referred to as a strictly high grade machine.

THE GUN STORE of Hartley & Graham, 313 and 315 Broadway, New York, was recently the scene of a sad tragedy. At about half past five o'clock on March 29, William W. Reynolds, who for 30 years has managed the export department of this firm, shot and killed Miles V. Kelly, head bookkeeper of the house. Then turning the pistol against himself, he inflicted a wound from which he died about midnight of the same day. No cause has been assigned for the act other than the insane freak of a man whose mind had become unbalanced by the illness of his mother. Some queer actions had been observed by relatives and others for some time past, but nothing that would indicate the man was crazy. The revolver with which the shooting was done had evidently been taken from stock during the day, as the tag was still attached to it. Mr. Reynolds was the oldest employee of the house and about 50 years old. He leaves a wife, but no children. Mr. Kelly had a wife and one son. An incident in Mr. Reynolds's history may not be out of place here. During the Franco-Prussian war Mr. Reynolds was in Paris in the interest of what was then Schuyler, Hartley & Graham for the purpose of securing further contracts for arms and ammunition, this firm having already supplied the French Government with much war material. The contracts, accompanied by drafts to pay for same, had been obtained, and as Paris was in a state of siege there was no regular way of getting out. In this emergency Mr. Reynolds constructed a balloon to get away in. Gambetta, who was also desirous of leaving, was so pleased with it that it was presented to him, he leaving immediately, while Mr. Reynolds set about having another made. In about ten days the second was ready, and, accompanied by Charles P. May, also identified with Schuyler, Hartley & Graham, they succeeded in leaving Paris, landing safely at Amiens, about 60 miles north of the capital.

THE QUARTERLY ISSUE of the desk calendar of the Nubian Iron Enamel Company, Cragin, Ill., comes to hand, with the following sprightly introductory note by manager Chas. E. Bonnell: "When we last came to you with our New Year's Salutory we were in the flush and heyday of the new year. '92 had been especially gracious, but since, we have been in sack-cloth and ashes, with the accent on *ashes*; we presume for appearance sake we should write in a lugubrious tone of voice, but we are naturally a sprightly and vivacious young thing, with a superabundance of animal spirits and we can't look blue; besides, the outfit was too small for us anyhow, and—well on the quiet, we were fully insured, but that, of course, is not the reason for our broad smiles and good appetite—it is because the 'still, small voice' whispers: 'Well done, good and faithful, &c.' you make the *best blacks on earth*, and that means—well, here's to you for the next three months." It evidently takes a good deal more than a mere fire to check the enterprise of this company.

J. C. GARRETT has retired from the old established Hardware business at 59 Haverhill street, Boston, Mass., and will be succeeded by his son, Edwin E. Garrett.

AMONG THE ATTRACTIVE PUBLICATIONS for the present season is one issued by the Pope Mfg. Company, Boston, entitled "Out-Doors," a book of healthful pleasure. The work contains 77 pages, liberally illustrated, with articles on different sports by recognized authorities. Both covers are illustrated in colors representing some of the popular out-of-door recreations. The topics treated are Lawn Tennis, Yachting, Terrestrial Flight—Bicycling—Football, Baseball, Horsemanship, Health and Rowing, Recreation and Sport in Canoes. The advertising is all confined to a few pages at the back of the book.

TROY NICKEL WORKS, Troy, N. Y., have appointed Francis Frost & Co., Toronto, Ont., as Canadian agents for the sale of their Alaska Stove Trimmings.

THE BIDDLE PURCHASING AGENCY of Philadelphia, New York, Pittsburgh and Chicago, have been succeeded by a corporation, and in the future will trade under the name of the Biddle Purchasing Company. W. C. Biddle is president of the new concern and Clement M. Biddle, secretary and treasurer.

IN THEIR PAGE ADVERTISEMENT appearing elsewhere in this issue, Brittan, Graham & Mathes, Pittsburgh, Pa., direct the attention of the trade to their Front Door Sets. Announcement is made that these Sets are made either plain or ornamental, and that flat Steel Keys for night work are furnished. The low prices at which these Sets are furnished is also emphasized.

Louisville.

(From a Special Correspondent)

THE HARDWARE TRADE continues remarkably good in most lines. Some merchants report quiet business, but others are rushed as much as ever, it depending on the class of goods carried and pushed by the different dealers. Besides the regular seasonable goods, Heavy Hardware, Contractors' Supplies, Agricultural Implements, &c., there is a vast amount of summer goods going out. Long before the flies and other pests are hatched the wise householders are preparing to prevent their ingress, and the retail dealers are making displays of Screen Doors and Windows of all styles. Weather conditions continue favorable for all out-door work, both agricultural and structural. Many improvements are contemplated this year that have lain dormant for several seasons, as the general promises of prosperous times ahead are flattering notwithstanding certain

financial upheavels in several localities through the South among the banks, but as in this city last year only home localities are affected, and renewed strength seems to flow instead of weakness and hesitancy.

In consequence of a good building season in view, all material entering into construction is being handled in large quantities. Lumber is in excellent demand, and the saw mills are all busy. The railroads and car manufacturing companies are heavy purchasers of all the desirable timber they can procure, as car construction will be liberally carried on this year. Except in a few temporary advances in staple goods like Nails and Fence Wire, there is nothing to portend higher rates, but, on the contrary, it will be proved that low prices and close margins will remain with us indefinitely, perhaps.

There is no objection to low prices, and competition will keep close profits in vogue, and so the dealers and manufacturers will get on as well as ever, providing the former are able to keep collections up close. But just there is the one point of danger. Goods are sold on too long time, too much risk for small profits. The jobbers are selling on a narrow enough margin to warrant them in demanding cash inside of 30 days, and if they got such returns sailing would be smooth enough.

Local Advertising.

THERE IS A GREAT DIFFERENCE of opinion among retail Hardware merchants as to the most effective method of advertising their business. It is a recognized fact that bright, judicious newspaper advertising produces good results, while dodgers or gutter snipes are considered by many to be worthless as an advertising medium. Regular customers need to be frequently reminded that they can purchase goods to better advantage where they are in the habit of trading than at some other store where they may happen to drop in. Live merchants stimulate trade at dull seasons of the year by offering special inducements in certain lines. The stereotyped form of notice attracts little if any attention in these stirring times, and something striking, which will instantly rivet attention, must take its place. The manner in which this was done in one case may be suggestive to some of our readers. A firm in a Western city prepared themselves for a large business in tools by providing sufficient stock in this line to meet all demands, and then sent the following postal card by mail to mechanics whose names were selected from the city directory:

WE HAVE BEEN ACCUSED

Of maintaining the Best and Cheapest place in the City whereat to buy

HARDWARE.

We are now making a Special Sale of PLANES, SAWS, CHISELS, AUGER BITS, BRACES, SQUARES, HAMMERS, HATCHETS and Everything in the TOOL line at Reduced Prices, for Thirty Days. Call and see us.

CASE & UEHREN,
TERMS CASH. 29 River Street.

We are advised that the results were entirely satisfactory, a good many inquiries having been stimulated and a demand created for those goods. We shall be glad to hear from others on this subject.

Exhibit of Callahan & Douglas.

CALLAHAN & DOUGLAS, Binghamton, N. Y., made an exhibit of goods in their line at the Industrial Fair held last fall in their city, a portion of which is shown in Fig. 763. The display board reached from the ceiling of the exhibition building to within about $3\frac{1}{2}$ feet of the floor, and filled the entire width of the space at the back. A star of chain was the central figure, within which small tools were artistically arranged. Tools of larger size were grouped with good effect on the board outside the star, showing lines of the various articles. On the floor directly

and states its advantages over pots. The tank is 75 x 14 x 5 feet and holds 400 tons of Glass. It is fed continually, and the Glass becomes gradually melted and purified while passing from one end to the other. Twenty-four blowers will be employed during the present fire, and arrangements have been made to increase the tank to a size sufficient to accommodate 30 blowers next year if desired, which is very probable. The advantages claimed for the tank are economy of fuel, economy of labor, improved quality of product, ease on the blowers and a saving of the cost of pots, rendering the production cheaper and the profits correspondingly greater. As to economy of fuel, the proprietors claim a saving of a large per cent. In the tank there are used 32 $\frac{3}{4}$ inch burners,

rights are about $1\frac{1}{2}$ inches square, 4 feet high. They are placed so as to occupy 8 feet space in length, having on the front side of each stick a number of square screw hooks from the top to the bottom, to support horizontally as many Rods as desired. The rack displays the Rods to advantage and keeps them straight, as they are supported at four equally distant points. About the floor of the window Reels are placed and other Fishing Tackle, also Baseballs in pyramids, Gloves, Masks, Bats, Tennis Goods, &c.

In this window they also have an upright glass case about 4 feet high, 6 feet long and 2 feet wide, backed with mirrored doors. In this are displayed Pistols on an upright rack, and a line of leather goods, such as Traveling Toilet Sets, Shaving Cases and similar goods. Near the window, in front of the counter, is a stand, as shown in Fig. 764, from which Ball

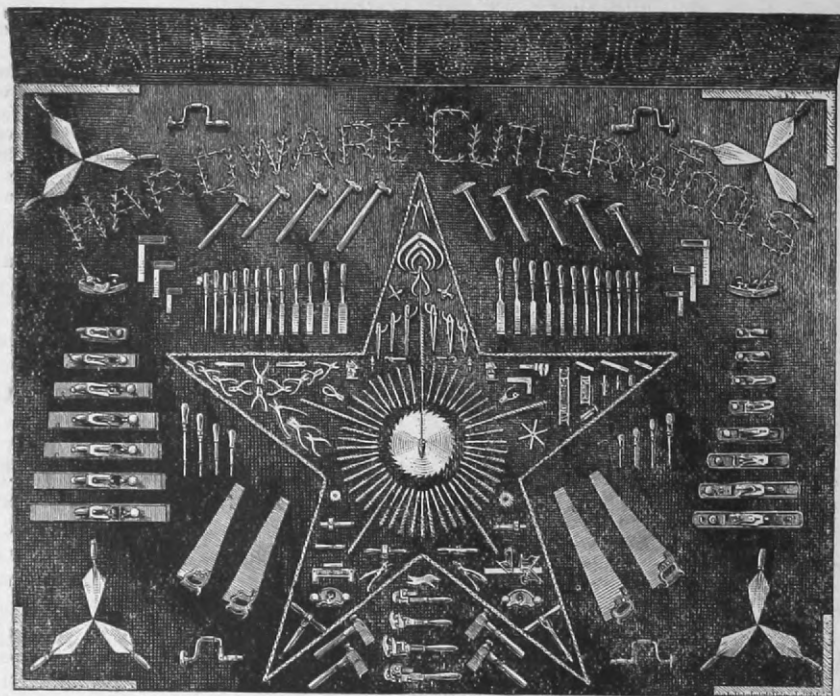


Fig. 763.—Exhibit of Callahan & Douglas.

in front of the star was a square formed of gallon cans of mixed paints, in the center of which was a table. Fancy coffee and tea pots were shown on the table. The other goods exhibited in their space consisted of lawn mowers, carpet sweepers, wringers, granite ware, fine builders' Hardware, &c.

Tanks for the Manufacture of Window Glass.

THE CHANGE which is being made from pots and furnaces to tanks in Window Glass factories, is a matter in which Hardware merchants who handle Glass are interested. This movement on the part of manufacturers is not to be attributed to philanthropy, but to the necessity of cheapening their output, and of placing themselves on an equal footing with competitors. Tanks are of various sizes, but an idea as to the relative capacity of tanks and pots may be gained from the statement that the Western district has eight tanks with a capacity equal to 350 pots, and the Eastern district two tanks equal to 78 pots. In the first case one tank has about the capacity of 44 pots, and in the second case the capacity of 39 pots. A Findlay, Ohio, daily paper gives an account of a tank costing \$18,000, which has been recently finished in one of the window glass factories in that city,

while the ten-pot furnace has 16 $\frac{3}{4}$ -inch openings. Again, the open space or space from the level of the Glass to the roof of the tank is one-half less than in a ten-pot furnace. It is easier on the men because they have their Glass nearly on a level with themselves and are not compelled to stoop, and the factory is much cooler. This factory used a ten and eight pot furnace last year, but with the increased capacity afforded by the tank and other corresponding improvements their output will be increased one-third, and will necessitate the employment of six more blowers and 50 more hands.

Sporting Goods Department.

BELCHER & LOOMIS, 89 and 91 Weybosset street, Providence, R. I., in connection with their large and varied stock of Hardware, find it profitable to give prominence to Sporting Goods. In this department are found Tennis Goods, Fishing Rods, Reels, Tackle, &c., Baseball and Athletic Goods, Revolvers, Traveling Toilet Sets, &c.

A rack for the display of Split Bamboo Fishing Rods in one of the large show windows is made by standing four shel-laced sticks in a line, and fastening them to the floor with angle irons. The up-

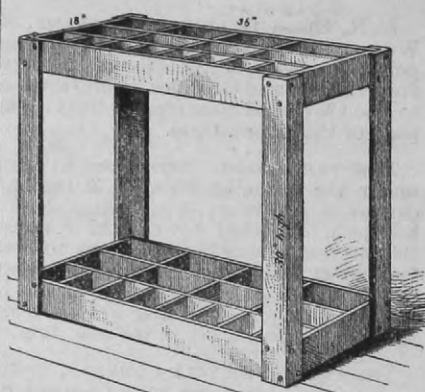


Fig. 764.—Rack for Ball Bats.

Bats are retailed. The partitions afford an opportunity of keeping the different styles separate, yet allow them to be easily examined and handled.

Tennis Rackets and Baseball Goods are retailed from a large counter showcase, while near at hand is a dumb waiter to the second floor, where the wholesale stock is kept, with a stock clerk in attendance to answer the call of an electric bell.

Tact in Selling.

IN AN ARTICLE containing hints on selling, *Ironmongery* of London gives the following advice to Hardware salesmen, which may be perused with profit: "It is very bad management to seek to force your opinions on a customer, such as, for instance, trying to get him to take Brown's make of Brushes when he explicitly asks for Smith's; or telling him that Jones' patent Ventilators are defective in principle when he asks for them, simply because what you happen to have in stock are of another make. Most people are inclined to suspect you are not acting honorably with them if you should seem to press them to take a different article to what they inquired for; much better is it to tell them candidly you do not stock Brown's brushes or Jones' Ventilator, but will procure them specially, at the same time showing what you do keep, without appearing to push them. But when a person does not specifically ask for a certain make of goods, you may unobtrusively influence him to take that of which you have a large stock, or which, for some other good reason, you would rather sell. It is much more satisfactory, both to your employer and your customer, that where you find you can use your influence over the latter you ought to get him to take a good reliable article

rather than one of the description popularly known as "cheap and nasty." Many a purchaser will actually seek the advice or opinion of the assistant who is serving him as to the merits of the article he is buying, and rests quite satisfied with the answer. It has often occurred to me that to correctly reply to all the questions asked by those who patronize an iron-monger's shop an assistant must needs be a walking encyclopædia. How to fix a Gas Pipe or an Electric Bell, how to replace an old Sash Line with a new one, how to clean a Silver Teapot or a rusty Range, the best way to use a Plane or an Axe, a Digging Spade or Garden Shears; the most appropriate color of Tile to suit this Grate, or the most suitable Knockers for that door; these and many others are repeatedly asked, and the assistant who fails at any of them is placed rather awkwardly, as the customer is likely to lose faith in his ability if he betrays his ignorance of the matter under consideration. It were much better for an assistant to remain silent rather than talk on a subject in which he is not sufficiently informed, for it is not unlikely that the customer may be thoroughly conversant with it, and an attempt on the part of the former to describe that of which he is ignorant can only result in the latter setting him down for an ignoramus all round.

Sheet-Iron Nail Pouches.

WE ARE indebted to H. S. Smith of Miller, Smith & Co., Chadwick, Ill., for a sketch and description of the Nail Pouches shown in Fig. 765. The Pouches are made of sheet iron 16

inches high, 16 inches deep and 10 inches wide, having a capacity of a little more than 100 pounds of Nails. They are so arranged that they are self-closing, and Nails can be taken from either side of the counter, or the Pouches can be used under the ledge. The point is made that the Pouches can easily be taken out, cleaned and filled and then be replaced; also that room is economized, as nearly the full height of the counter is utilized for Nails, thus dispensing with wide bins. In using the old style of Nail bins the company experienced inconvenience from Nails becoming mixed in weighing and putting them back in the bins. This dif-

Manufacturing.

THE SALEM WIRE NAIL COMPANY of Salem, Ohio, did an unprecedented business in the month of March. They shipped 110,000 kegs, of which they made 90,000 kegs during the month. These figures cover nothing but Nails. The claim is made by the company that both their shipments and production in March are in excess of similar business done by any other Nail works in the world. The quantities given are certainly enormous for a single company.

Norton Emery Wheel Company, Worcester, Mass., have been allotted a space 37 x 10 at the World's Columbian Fair. The exhibit will be open on three sides, and will include various sizes and shapes of Emery Wheels and numerous Emery grinding machines in operation.

The Inland White Lead Company, 149 and 151 Huron street, Chicago, have recently begun manufacturing operations outside of the combination. They will sell pure White Lead, White Primers and Putty in small lots to the Hardware and drug trade. Thos. S. Vaughan is president, and Benj. F. Haddock is vice-president and treasurer.

Eugene Munsell & Co., 218 Water street, New York, are increasing their facilities for manufacturing Micanite. It

goods are referred to by the company as drop forged, solid steel, well tempered and polished, and fully warranted. The Burner Plier is made in 5, 6 and 7 inch sizes, the first two having one opening and the latter two sizes of grip. The Gas Pliers are made in seven sizes, 7 to 14 inches inclusive, with two sizes of openings and screw driver attachment on one arm. Both classes of Pliers have the usual grip for small work on the end.

The Dubuque White Enameling Works at Dubuque, Iowa, whose plant has been in course of erection for some months, turned out their first product on the 27th ult. It was pronounced of very high quality by those who had the privilege of examining it.

Butts & Ordway, 500 Atlantic avenue, Boston, Mass., manufacturers of the well-known "B. & O.," specialties, which include the Sure Grip Adjustable Jaw Foot Vise and the Sure Grip Tire Upsetter, report a growing demand for these tools, and advise us that they are now prepared to fill orders promptly. "B. & O.," Solid Wrought Iron Anvils, warranted and of best English make, have recently been added to their line. These Anvils will be replaced if found defective.

The Clifton Springs Mfg. Company, Clifton Springs, N. Y., are manufacturing an extensive line of Evan's anti-rusting Tinware and other Tinware specialties. Among these are included Pails, Sprinkling Pots, Dish Pans, Tea Kettles, Foot Baths, Toilet Sets, Chamber Pails, Comodes, Wash Boilers, Dippers, Cups, &c. They also make the Harland and Angle Faucet Oil Cans; Mrs. Van Deusen Cake Molds, Coffee Pots and Dinner Pails.

H. H. Harvey, Augusta, Maine, has decided to rebuild his Hammer and Tool works, which were recently destroyed by fire. The forge shop has already been commenced and frames for the other buildings will be placed at once, so that the work may be continued until the entire set of buildings are completed. The plant will include the engine, boiler and coal rooms, of brick, which were left standing. There will be erected one two-story building 55 x 45 feet, to be used on the first floor for steel, iron and pattern rooms, &c. The second floor will be used for an iron machine shop, together with wood-working and turning shop. This will be supplied with the most improved machinery for the manufacture of Stone-jacks, Derricks, &c., and for a general jobbing business. There will also be a forge and hammer shop, one-story high with monitor roof nearly the entire size of the building, which will be 60 x 41 feet. This building will contain about 25 furnaces and forges, together with steam hammers, presses, Bradley and other trip-hammers. The shop will have a capacity of forging 2 tons of hammers and 2 tons of granite tools per day, besides chains, bars, picks and ironwork for derricks, winches, stone-jacks, &c. There will also be built one two-story building 103 x 30 feet, the first floor to be used for grinding and polishing rooms, office, tool and store rooms, &c., &c. The second story of this building will be used for the manufacture of bush hammers and other fine tools connected with the granite, marble and brownstone trades, together with mason, blacksmith, grist-mill, railroad and prospectors' hammers and tools. A large portion of this floor, about one-third, will be used for the advertising department of the business, such as the printing of catalogues, &c., and possibly the publication of a weekly paper in the interest of the granite and building trades. At the west end of this building, extending toward the dam, Mr. Harvey contemplates building a foundry 50 x 40 feet. Mr. Harvey's three sons will continue to have full charge of the Hammer and Tool works and everything connected therewith, each having a department.

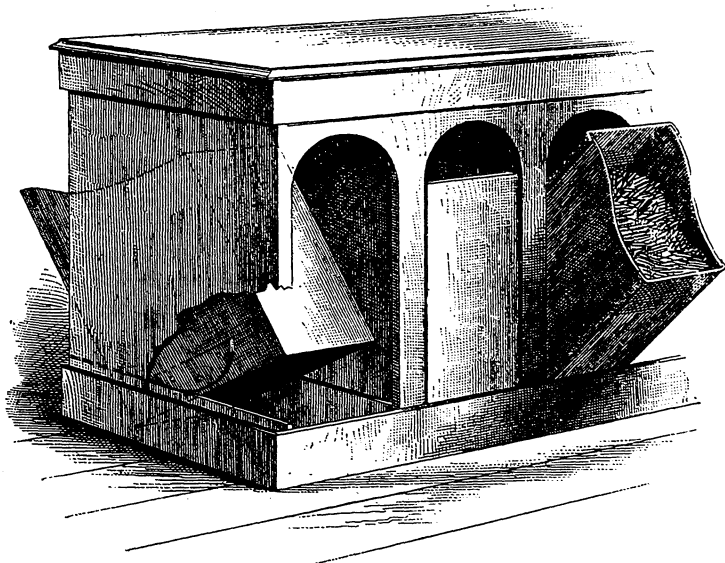


Fig. 765.—Sheet-Iron Nail Pouches.

will be remembered this is a production for insulating purposes that is being largely used by electrical companies. By improved processes of manufacture waste mica, heretofore almost valueless, is being made into an endless number of forms and shapes, sheets that can be cut to size included. We are advised that orders are coming in very freely, and, while so far they have managed to execute them with reasonable promptness, they are being pushed to keep pace with the demand. Electricians have experimented with almost everything for this purpose, but have fallen back on mica, which for many uses has heretofore been unavailable on account of great cost.

The Peck, Stow & Wilcox Company have commenced the manufacture of a line of Gas and Burner Pliers. These

Prize Competitions

\$25.00.

Prize Competition No. 19

SUBJECT :

Electrical Goods as a Part of a Hardware Stock.

The increasing demand for Electrical goods and their more general adoption in homes, hotels, stores, offices, public buildings, factories, and for street rail roads, makes the subject a pertinent one to the Hardware merchant, especially as Gun and Locksmiths are endeavoring to absorb this line of trade in many places. The competition is designed to draw out expressions as to the advisability of including Electrical goods in Hardware stocks; to what extent these goods should be carried; assortment of goods which can be handled profitably; the best manner of arranging and displaying these goods; whether installing and Electrical repair work should be included, and to what extent electrical devices can be supplied to manufacturers and to street rail roads.

This competition will remain open until April 29, 1893.

Those intending to compete are reminded that it will not be necessary to write long essays, but that comparatively brief and business-like answers will be favorably regarded as meeting the purpose for which these competitions are announced.

The following prizes will be awarded :

First prize	\$12.50
Second prize	7.50
Third prize	5.00

The prizes will be awarded for answers which in the judgment of the committee of award are most suitable for publication and of the most general interest. We reserve the privilege of extending the time on any competition in case the contributions received are not of sufficient number or merit for the committee to award prizes. These competitions are open to every one, and it is hoped that there will be a general response from business men. We shall have the privilege of publishing any or all of the contributions received.

Replies are to be received not later than April 29, 1893. They should be addressed as follows :

DAVID WILLIAMS,

96-102 Reade street,

New York.

Prize Competition No. 19.

The committee to whom the contributions in Prize Competition No. 5 were referred have awarded the prizes as follows:

First Prize to H. S. DRUMMOND, Newark, N. J.

Second Prize to CHESTER G. AMBLER Danbury, Conn.

Third Prize to H. P. KING, Portland, Ore.

Other Competitions which have closed are now in the hands of the Committees of Award, who are giving careful attention to the claims of the different contributions. From the number of these and the evident merit of not a few of them, we are assured that a great deal of valuable information and suggestion will be put at the disposal of the trade.

The Weekly Prize Competitions noted below are now before our readers and remain open until the dates named:

No. 16. Closing April 8.

Three or More Rules to be Observed in Buying.

No. 17. Closing April 15.

How Merchants Should Treat Traveling Salesmen.

No. 18. Closing April 22.

The Extent to Which Merchants Should Devote Their Attention to Outside Interests.

No. 19. Closing April 29.

Electrical Goods as a part of a Hardware Stock.

Another subject will be announced in our next issue.

Bicycles.

SERCOMBE-BOLTE MFG. COMPANY, Milwaukee, Wis., issue a catalogue, form 2, 1893, illustrating and describing their Ball Testing machine; Telegram Full Roadster and detailed parts of the same; Telegram Light Roadster; tubular frame connections; Sanger racer frame; frame of Ladies' Telegram; Lightning Messenger; Special Sanger Racer; Ladies' Telegram; Front Driving Safety; Telegram Pneumatic Tire; wrenches, pumps, cushion tires; saddles and Bicycle sundries.

The McIntosh-Huntington Company, Cleveland, Ohio, devote a catalogue to Bicycle sundries, in which a line of these goods is illustrated. Lucas' Lamps are first shown, many improvements having been made for the season of 1893, among which is a reduction of weight in the Holophote Lamps, and a use of Bull's-Eye Lenses in the entire line. Further illustrations include bells, whistles, luggage carriers, trouser guards, toe clips, padlocks, stands, cyclometer, saddles, tool bags, wrenches, pumps, oilers, &c.

Lindsay Brothers, Milwaukee, Wis., send an illustrated catalogue of Bicycles and cycling accessories. Views are shown of some 35 machines, varying in price from the Lindsay Pneumatic, a high grade Wheel, to a boys' Bicycle. Lamps, locks, shoes, coats, caps, clamps, bugles, &c., are also illustrated.

Washington Cycle Company, Washington, D. C., are introducing their '93 Capital Cycles, and state that they can suit any local fancy as to high head, any shape of handle bar, any kind of handles, any shape of seat post, and almost any make of saddle desired. They also offer a choice from several makes of tires. They call attention to the fact that in this way a rider can get a wheel made almost entirely to his order.

How to Keep the Store Neat and Clean.

FIRST ARTICLE.

BY M. W. CARLETON.

THAT HARDWAREMEN in general are noted for their enterprise and intelligence is a fact generally recognized, and for this reason it seems strange that so large a number of them are negligent of the arrangement and cleanliness of their storerooms. A great many of them who have scrupulously clean, neat and tidy houses, and who would quickly find fault at any breach of the laws of order therein, will permit their offices and storerooms, in which they probably spend more of their time, to become so untidy and unclean as to cast reflection on the entire craft.

The fact is, the old proverbs, "Cleanliness is next to Godliness" and "Order is Heaven's first law" are as applicable to the Hardwareman as to his fellow merchant in any other line of business. That it is possible to have a Hardware store almost if not quite as attractive as that of the clothier, dry goods man, or even the jeweler, may be demonstrated by a visit to a store of the modern class, such as are happily becoming quite common in most localities.

When the actual advantage, attractiveness and economy of such a store is seen, it is a cause for wonder that these facts are not more generally recognized by the Hardwaremen, who, of all others, have the reputation of being the most progressive and ready to adopt any advanced business methods. So, laying aside all moral and social considerations, it seems strange that there are so many stores of the "good (?) old kind" in existence at the present time.

OLD FOGY.

Comparing one of these with one of the modern, progressive class, the contrast is startling and the advancement of late years, especially of the last decade, very noticeable. In locating a storeroom of the former class the size is one of the principal considerations and such matters as light, ventilation and general arrangement are of minor importance. The shelves and counters are inconvenient, rough and unattractive features; the show windows entirely too small; the floor of wide pine boards, often warped out of shape, while Nail kegs, case goods, Agricultural Implements, &c., are disposed around the room with little regard for anything but convenience. Such a store as this can scarcely be made presentable even at the expense of prodigious labor. In contrasting the modern store the difference is such as ought to make even an "old fogy" a convert to the new regime.

PLENTY OF LIGHT.

In place of the plain, open shelves with untidy rows of goods, and the old, unsightly counters with the rows of Nail kegs alongside, there are the attractive, cleanly rows of drawers with the samples advantageously displayed on the background of green or black, and the broad, oak counters with the convenient bins for Nails, &c., beneath.

By these arrangements two of the principal causes of untidiness, viz.: the open, dusty shelves and the unsightly Nail kegs, are obviated. Another great improvement is the racks or brackets for Steel Goods, Shovels, &c., by means of which these articles may be suspended from the ceiling or wall, leaving the floor entirely accessible to the broom. The Stoves carried in stock are placed on trucks and may readily be moved for sweeping or display. Then the little untidy show case with its seldom-changed assortment of Knives, Scissors, Revolvers, &c., is superseded by a larger and more attractive one, with effective display arrangements, while still another improvement of much importance is the windows of large, clear glass, admitting plenty of light and dispelling the gloom, usually found in so many stores of the older class.

ATTENTION TO CLEANLINESS.

So much for arrangement, for in that lies half the solution of the problem, but it is not the other and usually neglected half by any means, since no convenience of arrangement or elegance of fixtures can compensate for lack of attention to cleanliness. Of course it will be admitted that it is not as easy to keep a Hardware store presentable as some other lines, but it is not an impossibility by any means. A store may be scrupulously clean so far as freedom from dirt is concerned, yet be far from attractive and inviting, because of the untidiness and confusion. To prevent this is fully as important as sweeping and dusting. To this end waste baskets should be placed behind the counter at convenient intervals, in which all discarded wrappings, &c., should be deposited. Another cause of untidiness is the habit of leaving articles on the counter and ledges after a sale is made, and to avoid this salesmen should be instructed to replace everything as soon as possible. However, it is sometimes impossible to do this during the busy time, but it should be attended to at the first opportunity, since it not only improves the appearance of the room, but loss by theft, &c., is avoided.

ORDER.

Where purchases are left to be called for they should be carefully wrapped and plainly marked and put in a certain part of the store. It is important that there should be a certain place for this purpose, and one clerk should be made responsible for these packages as far as possible, as much confusion and annoyance will be avoided by such a plan. While replacing the stock the tools in use around the store should be returned to their proper receptacles and the loose Nails, &c., gathered up.

COVERING COUNTERS.

At the close of business the counters, cases, racks, &c., should be covered over with gingham covers to protect them from the dust caused by sweeping and dusting. These covers will be found very convenient, as they not only lessen the labor of dusting, but preserve the goods from damage and soon pay for themselves for this reason alone.

SWEEPING.

All stores should be swept daily, and if possible the sweeping should be done in

the evening in order that the dust may settle during the night.

While sweeping seems simple enough, it is a fact that it is seldom properly done. To tell the average man that he does not know how to sweep will probably arouse his indignation, but it is true, nevertheless. To some it may sound ridiculous to talk about the "science" of sweeping; nevertheless, there is a knack about it which can only be acquired by experience. It is amusing to hear a man speak about the dust in his store when you know that he does not even dampen the floor before sweeping. This scarcely sounds reasonable, but there are many who do not do this. Dampened sawdust, scattered on the floor, is better than sprinkling, since it absorbs the dust, and the floor may be swept cleaner and more satisfactorily. The old broom in the hands of the average "junior" or porter is responsible for a great deal of the dust on the shelves. The sweeping brush is so much better in every respect that its use will be continued after one trial. While the first cost is greater, they are really more economical than the brooms, as one brush will outlast several brooms.

GET IT OUT OF SIGHT.

The old method of disposing of the sweeping or rubbish was to sweep it under the stove or in the corner, the easiest way to get it out of sight; but the proper way is to burn it wherever possible. If this cannot conveniently be done, it should be deposited in an iron can until it may be otherwise disposed of. It is important that an iron can be used, since there is danger of fire from cigar stumps, &c., where wooden receptacles are used.

DUSTING.

Next comes dusting, and it is very essential that this be thoroughly done. Good feather dusters should be used, the windows raised and doors opened, and every particle of dust removed. All shelf goods should be thoroughly dusted at least twice a week, and the upper tiers taken down and thoroughly cleaned. When doing this, the older or shopworn goods should be placed on the top, where they will be the first sold. Attention to these minor details will do much to improve the appearance of the stock.

After the dusting is completed, the showcases and windows should next receive attention, as a dirty, grimy case is worse than none, because it advertises carelessness and slothfulness instead of the goods, as intended. It will usually be found necessary to clean the showcases at least once a week, and the samples should be rearranged frequently. The best method of cleaning glass is to use a cloth dampened with alcohol and dipped in whiting, ending with a polish by means of a dry chamois skin. In this way a brilliancy is imparted which is not attainable otherwise. It is a common mistake in cleaning show cases to overlook the metal corners, and the effect is as bad as unfinished work in general. These should be brightened whenever necessary, but all traces of polishing material must be removed from the glass.

In summer much annoyance will be experienced from flies, and at that season windows and cases will require careful

attention to keep them clean. An effectual and inexpensive protection against these pests is common colored mosquito netting.

A SEPARATE ROOM.

Unless it be possible to have a separate room or a certain part of the storeroom for the purpose of receiving and unpacking goods, much dirt and confusion is unavoidable. Wherever possible this work should be assigned to a responsible and trustworthy person, and all goods received by him should be entered in a book especially for the purpose and the invoices checked from it. This plan does away with many errors and the unpleasantness of claims for shortages is avoided, and it is not necessary to keep the goods out of stock pending the arrival of the invoices. Under no circumstances should the cases be trucked to the various parts of the store and there opened, as such a plan not only causes a great deal of untidiness, but the goods are frequently lost or stolen.

Attention should be paid to the samples in the showcases and on the drawers, and they should not be allowed to become soiled and rusty. Whenever they show tendencies of this kind they should be replaced by new ones at once.

ENTIRELY OUT OF PLACE.

Another point worthy of mention is the gaudy and senseless placards, &c., often displayed promiscuously around the room. They seldom improve the appearance of the store and in many instances are entirely out of place. Of course there are many which are really attractive and may be displayed to advantage, provided they are not too numerous, but nine-tenths should be thrown in the fire. There are many other points worthy of consideration which cannot be treated here from lack of space, but they will readily suggest themselves to any one giving the subject the study essential to its successful application, and it is to be hoped that the interest will continue unabated and the advancement in the next few years be as satisfactory as in the past decade.

John Humphries, Jr.

THE DEATH of John Humphries, Jr., secretary and treasurer of the Humphries Mfg. Company, Mansfield, Ohio, occurred February 27 at New Orleans, Mr. Humphries having been spending some time in the South hoping to recover his health, which had become impaired. The directors of the company with which he was prominently connected make appropriate reference to his death in a circular letter from which we make the following extract:

The Humphries Mfg. Company is the creature of his brain, his excellent business ability and his untiring energy. He organized it, fostered it and, as its secretary and general manager, made it the prosperous plant it is—in fact, to his intense application in furthering its business may be traced the impairment of his health.

Months ago his associates saw the necessity for rest, if restoration to health was to come to him. He was induced to go and spend the winter in the health-giving climate of New Mexico; but he had delayed his going too long, and it became evident that the one obstacle he could not overcome, disease, the one enemy he could not conquer, death, were in the mastery. All that loving hearts and willing hands could do was done. His will-power prolonged the contest and his life for months, but he realized that the end was nigh, and he became greatly anxious to return to his home, but that bliss

was not to be his. On the return journey, while tarrying at New Orleans, La., on the morning of February 27, he passed away. His body was brought hither, and on Saturday, March 4, we laid him away.

Our patrons and friends will indulge us, and appreciate our feelings of sadness and sorrow at our final separation from one on whom we were accustomed to greatly rely, and to whose business sagacity and tireless energy our great prosperity as a corporation was due.

His associates take up the work where he laid it down, but we cannot refrain from giving publicity to an expression of our confidence in his integrity, our love for the man, and the almost irreparable loss we sustain in his death.

Price-List and Circular Case.

THE views shown in Figs. 766 and 767 represent case used by Geo. Krause & Co., Lebanon, Pa., for keeping small price-lists and loose circulars which it is desirable to preserve, and yet

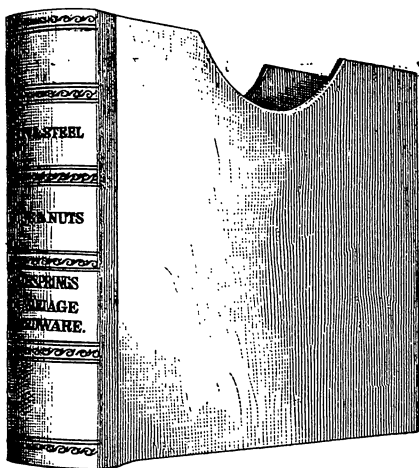


Fig. 766.—Price-List and Circular Case.

are difficult to keep in a convenient form for ready reference. The cases are bound in leather and cloth, of different colors, with lettering on the back describing the contents, which when put on a shelf side by side make a fine appearance, and re-

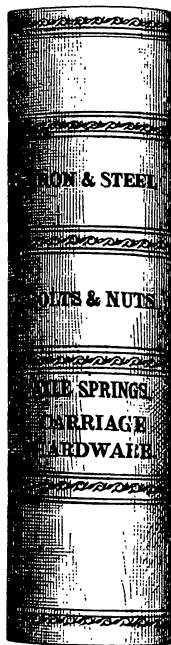


Fig. 767.—Appearance of Case on the Shelf.

semble to a marked degree a set of volumes. The most desirable size for these cases has been found to be 9½ inches high, 14 inches deep and 3 inches thick. F. W. Frost of Lebanon is the manufacturer, who has also made others for parties who have seen these at the above store.

Price-Lists, Circulars, &c.

BINDLEY HARDWARE COMPANY, Pittsburgh, Pa.: Spring and Summer Catalogue. Illustrations are given of Pocket Cutlery, Hay and Manure Forks, Hoes, Rakes, Cradles, Snaths, Lawn Mowers, Scythes, Horse Hay Forks, Handles, Scythe Stones, Lawn Sprinklers, Farm Bells, Barrows, Shovels, Screen Doors and Windows, Spring Hinges, Hammocks, Toilet and Horse Clippers, Water Coolers, Refrigerators, Carpet Sweepers, Bicycles, &c.

GEO. M. SCOTT & Co., Salt Lake City, Utah: A few facts concerning artistic Hardware. The pamphlet contains a reprint of "Builders and Hardwaremen," which recently appeared in *The Iron Age*, and is dedicated to all persons contemplating building.

BERGER BROS., Philadelphia, Pa.: Tinners' Hardware and Roofers' Supplies. Their 1893 catalogue describes and illustrates Trimmings, Enameled Tea Pot Knobs, Stove Turnbuckles, Leather Plungers, Solder, Soldering Coppers, Hooks, Pipe Fasteners and Cleats, Eave Trough Hangers, Star Steel Roofing, Long Eave Trough, Gutters, Spiral Lock-Seam Pipe, Galvanized Steel Ridging, Crestings, Finials, &c.

GEO. S. COMSTOCK, Mechanicsburg, Pa.: Agricultural Implements. Illustrations are shown of Feed Cutters, Cider Mills, Rollers, Sickle Grinders, Road Scoops, Bag Trucks, Saw Mills, Hay Rakes, &c. The circular referring to these goods is arranged in the form of an insurance policy.

THE NEVERSLIP HORSE SHOE COMPANY, Boston, Mass.: The Neverslip Cork Horse Shoe Pad. The manufacturers state that the Pad is so designed that it can at once be applied to the foot with any shoe, and that the Pad is open so that the sole of the horse's foot is exposed to air and moisture, preventing heating, while a cushion is provided for the horse's frog in the proper place.

NATIONAL SCREW & TACK COMPANY, Cleveland, Ohio: Iron, Brass and Nickel-Plated Wood Screws, Machine Screws, Stove Bolts, Tacks, Nails, Tire Bolts, Sink Bolts, Side Knob Screws, special Bolts, special Wood Screws, &c. A convenient catalogue, indexed through, showing page on which price-list and illustration appear, is issued by the above company.

MASSEY VISE COMPANY, Chicago, Ill.: Vises. A line of Perfect Vises as shown, including mechanics', coach-makers', lightning grip and wood workers', also the Tip Top Double-Acting Friction Drill. One movement of the hand is described as sliding the loose jaw of the Vise from and against the work, instantly fastening it, thus saving all the lost motion which might otherwise be required to hold various sizes of metal or wood between the jaws.

THE BELCHER & TAYLOR AGRICULTURAL TOOL COMPANY, Chicopee Falls, Mass.: Agricultural Implements. Illustrations are given of Sulky and Walking Plows, Shovel Plows, Harrows, Cultivators, Hoeing Machine, Tobacco Ridger and Potato Coverer, Feed Cutters, Vegetable Cutters, Corn Shellers, Barrows, Trucks, Fan Mills, Tedders, Horse Rake, &c.

IRVING D. BOOTH, Elmira, N. Y.: Iron, Steel and Heavy Hardware. Among the goods represented in the catalogue are Bar Iron, Horse Shoe, Band and Hoop Iron, Light T-Rails, Angles, Steel Channel Bars, Steel I-Beams, Norway and

Swedish Iron, Cast, Machinery, Tire, Spring and Cant Hook Steel, Steel Shafting, Black and Galvanized Iron, Nuts, Washers, Bolts, Spikes, Rivets, Horse, Mule and Ox Shoes, Chain, Wire and Cut Nails, Wrought Iron Pipe, Well Casing, Bright and Terne Plates, Metals, Copper, Wire, Glass, Metal Roofing, Troughs, Spouting, &c. Tables of weights and dimensions add to the value of the catalogue.

After Mexican Trade.

By WM. H. MAHER, TOLEDO, OHIO.

No. V.—*City of Mexico (Continued).*

PASSING ALONG the finest streets of the city after business hours, one cannot help but notice the solid iron shutters and the three or four padlocks on every door. Surely these are not needed as against burglars? No, they are as defense and protection in time of riots and political broils.

Mexico has been the scene of many political revolutions, and one merchant told me that in his experience he had to put up his shutters many times to save his windows from flying bullets.

Under President Diaz, who is serving his fourth term, the country has prospered and the business community unite in praising him. His predecessor was Gonzales, who is commonly reported to have increased his wealth \$36,000,000 during his four years' Presidency. This may explain why a high tariff is needed in Mexico to meet current expenses and interest on public debts. Now for my trade notes: Mr. Geo. Glessner, manager of the Champion Mower & Reaper Works, Springfield, Ohio, after a thorough canvass of the Republic for his goods, told me the trade there was not worth looking after. One agency in the city sold about 20 Mowers per year. He said that he could sell more machines in one good county in Ohio every year than in all of Mexico.

Mr. Tuscano of New York, of the Babcock Plated Ware Works, found no trade, but did not make much effort, as his trip was largely for the benefit of Mrs. Tuscano's health. Mexico ought to be a fair field for Plated Hollow Ware. So far as I could judge the Meriden Britannia Company now have the most of that trade, but judicious advertising in the high-class Mexican papers would increase the demand.

In Flat Ware I found goods of William Rogers & Co., Rogers & Bros., Holmes & Edwards Silver Company, Hall & Elton Mfg. Company (old patterns), and Simpson, Hall, Miller & Co. English Plated Ware is quite common, too, but American goods appear to have the lead.

One of our party represented Bliven & Carrington, Lubricating Oils. He was a native of Spain, and so was at home in speaking with Mexican trade, and he seemed to be having a very successful trip.

Mr. Scoville, manufacturer of the Perfection Oil and Molasses Gates, found his goods already well introduced to the Hardware trade of Mexico, through the Simmons Hardware Company, and Hibbard, Spencer, Bartlett & Co. When he showed his card to a retailer in San Luis Potosi, he was met with the remark:

"Yes; we know your goods; we have them in stock."

Curious to learn in what quantities he bought he asked the question, and was answered:

"I bought one gross."

They stepped back to the stock shelf and Mr. Scoville saw there were about seven dozen on hand. Such a concern in the States would not buy over three dozen at one time.

An article like Brown's shoe dressing must be used by the masses to be profitable to the dealer. The masses in Mexico do not wear shoes; a large part go barefoot; another very large part wear sandals. But the higher class ladies are very proud of their feet and wear expensive shoes. The contents of a case of shoe dressing, packing and strong box, makes a very heavy package, and the tariff being on the gross weight the goods cost heavily in the Mexican store. Hence, a bottle of the dressing that can be sold for 10 cents in the States must be sold at from 35 to 45 cents in Mexico.

But Mr. Rowan found the Brown dressing on sale and was encouraged by his trip to look up the question of advertising and arrange to push the trade there hereafter.

In the matter of steam boilers, as reported by Mr. Anderson of Harrisburg, those seen there are mostly from the States. Of course, there is no such continual growth of factories as here; yet the spirit of progress is felt there. Mr. Anderson secured orders for his boilers and looked upon his trip as a profitable one.

The development in Mexican railroads has opened a market for cars, and every city of any importance has its street cars. Our companion, G. M. Brill of Philadelphia, had already made cars for almost every city line in Mexico, but he now found it profitable to make the personal acquaintance of the various officers, and came home with some fine orders in his pocket.

The milling industry in Mexico is in a crude state. This branch was well looked up by Aug. Wolf of Chambersburg, manufacturer of Flour Mills. The common people eat corn and do their own grinding on a crude stone. Flour mills are old-fashioned, and but little encouragement was given about changing. It appeared strange to me that our Northern millers had not worked up a trade in Mexico for their low-grade export flour. In the dry regions such flour could be sold at less than the people pay for corn.

The furniture trade in Mexico is confined to the upper classes. Looking into the open doors of scores of poor houses one rarely sees a chair, or bedstead, or table. Occasionally there is a cheap little stand for the lamp. The bed, mostly old clothes, was made on the earthen floor, and people squatted on the ground in lieu of sitting on chairs.

But the well-to-do people delight in nice furniture, and Mexico would be a good market were it not for the tariff, which is particularly burdensome on this line. Our Mr. Yager of Allentown made some sales in almost every city in which we stopped, and I saw furniture in the shops from Chicago and Grand Rapids.

As a sample of prices, I saw a fair-looking table, such as would sell in the States for \$4 to \$5, sell here for \$12. A parlor chair, worth, say, \$10 in the States was offered in one window at \$33. Of course such prices limit sales.

Mr. Brooks, representing "Sterling" pianos, had previously never sold goods in Mexico, but came home with an order from a leading dealer that made his trip profitable.

F. E. Myers of Ashland, Ohio, is manager of two concerns, whose interests he was looking after—Myers & Bro.'s Pumps and Canton Plows. I have already given memoranda of what was discovered in the Plow trade, the sales being mostly in a very cheap Plow, made specially for that market. In Pumps, while several American names are known there and their goods sold, a larger share of the trade seemed to be in a very inferior German Pump, and Mr. Myers' special efforts were to dislodge that and work in his goods. He secured several very gratifying orders and was well pleased with the results of the trip.

The Crane Company of Chicago had a representative with us, but this concern are already well known in Mexico. A Crane elevator took us up and down in the Hotel Iturbide, but it only runs between 8 a.m. and 10 p.m. The early, as well as the late, birds had to walk. The concern were also well known in mining and railroad circles, where they have a good trade.

The Bicycle trade of Mexico is just coming into being. Up to one year ago Bicycles were prohibited on the city streets, but this law was revoked, and Bicycles are now seen everywhere. A representative of the Western Wheel Works, Chicago, was with us, although the factory has given Mexico trade to the Simmons Hardware Company, and the business done by Mr. Boericke was turned over to the St. Louis house. He took a nice order in the City of Mexico.

President Diaz's son rides on an elegant nickel-plated Columbia, for which he paid \$300. In the Mexican *Financier*, a paper apparently controlled largely by Seeger, Guernsey & Co., the following Bicycles are advertised: The Liberty, Niagara, Union, Sund, all American machines. Boys' Tricycles are not seen in any number, and that trade is waiting for some one.

Baseball has just come into popularity, and will eventually take the place of bull fighting, which, in nearly every State in Mexico, has been prohibited, because of its brutalizing effects. Spalding & Co., apparently a branch of our Spalding Baseball concern, have a store in the City of Mexico. In southern Mexico clubs were out playing, for though you were having a blizzard in New York it was 92 degrees in the shade at 3 o'clock p.m. in Yucatan.

Walker & Sons of Canada sent a gentleman with us to look up the whiskey trade. In all but the northern part of Mexico the drink of the common people is the juice of the century plant—pulque (pronounced pool-ke).

This plant grows in poor soil, regardless of rain or irrigation. It is seven years in coming to proper condition; then the heart is cut out, leaving a bowl-shaped receptacle in which the juice

gathers, and this juice is drunk by the natives. It looks like blue, watery milk; it smells and tastes like yeast. It is sold for 1 cent a glass. It has a powerful effect on the urinary organs, and is said to cure Bright's disease. It spoils in three or four days, and no process has yet been discovered by which it can be kept longer, hence is never sent out of the country. A prominent official told me that from the best data he and others had, the common people of the City of Mexico spent \$5,000 per day for this drink. They want it morning, noon and night, and as much oftener as they can get it.

By distilling pulque a fiery liquor is obtained, called mescal, which burns and tastes like forty-rod new gin, and is wildly intoxicating, producing an ugly, fighting, murderous drunk. It is sold at a few cents a glass.

The better classes take as their favorite drink French wines, champagne and brandy, which are as cheap in Mexico as in New York. Our American whiskeys are not much drunk there, though Kentucky labels are by no means rare on the shelves.

Mr. Porter, who represented Walker & Sons, had great difficulty in overcoming the popular demand for brandy as against whiskey, but he sold Canada whiskey in every city we were in, and I think made a very successful opening for his goods.

Mexico is by no means backward in electric work. We found every city of 4000 inhabitants and upward lighted by electricity. None of the street car lines were run by it, but mules are cheap, streets are narrow, and were I at the head of affairs I would hesitate about having wires and poles fill these streets. Factories and hotels were lighted by electricity, and the Brush engine seemed to have almost a monopoly. The handsome \$300,000, opera house at San Luis Potosi will have an electric plant in it. Mr. Augier, representing the Mather Electric Company, thinks he is tolerably sure of this contract.

In conversation with an American of musical tastes, resident of Mexico, he told me there was a good opening there for melodeons and parlor organs. The Mexicans are a musical people; the band is playing every evening on the plaza for the populace. He said a company that would send down lady teachers, and would push the organ trade would soon work up an immense business.

The American sewing machine is well represented in every city. It usually has one of the finest stores on the best streets, has handsome signs, and lets its praises be known. I fancied I saw the Singer, Home, Domestic, and Remington advertised more generally than any others.

These are my notes, as I gather them in talk with my companions, and represent a variety of goods and our experience to the time of leaving the City of Mexico. In Pueblo I spent a large part of a day with a Hardware salesman, who has been there for years selling American Hardware in Mexico, and in my next I will give notes of his experience and a list of American Hardware most popular there.

(To be continued).

Arrangement of Stores.

SPORTING GOODS.

A VERY NEAT and compact arrangement of sporting and athletic goods is shown in Fig. 768, for which we are indebted to Case & Uehren, Aurora, Ill. The space of 26 feet between the show window and stairway is devoted to Baseball Goods,

counter is used for storing Indian Clubs, Dumb Bells, Minnow Pails, &c. In front of the counter is a rack for containing Baseball Bats, as shown in the cut. Bicycles are stood along in front of this counter. Another display of jointed Rods is made around the show window, as shown in Fig. 769. The upper portions of the Rods are held in a strip of rubber belting 1 inch wide, tacked on the sash bar and cut to receive the Rods. The butts stand on a board strip around the bottom

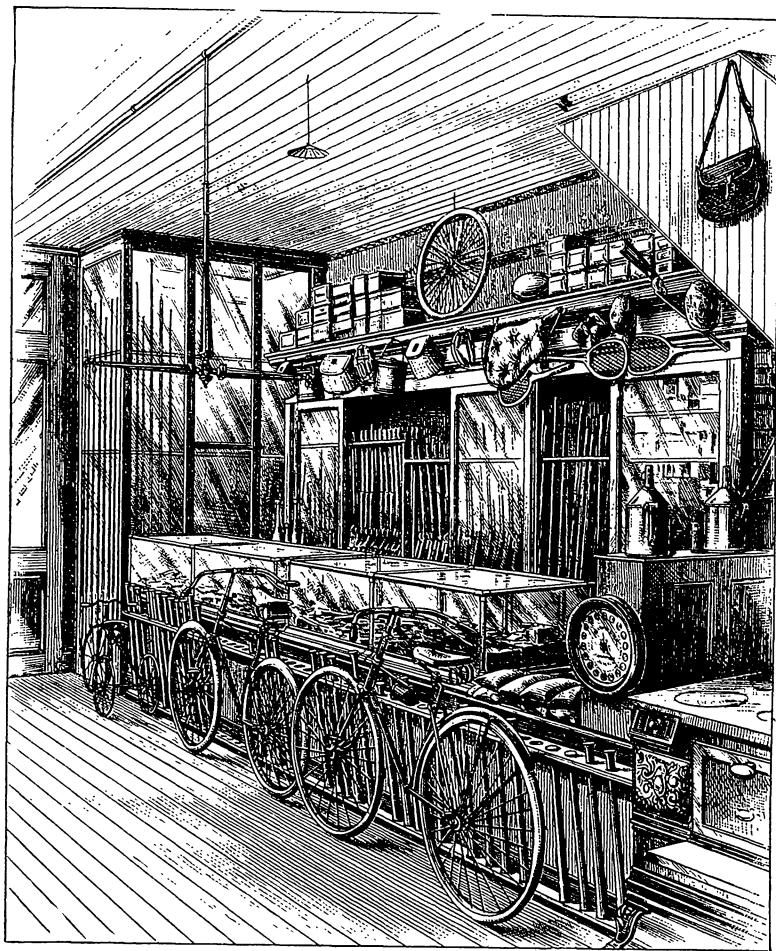


Fig. 768.—A Sporting and Athletic Goods Corner.

Fishing Tackle, Tennis Goods, Guns, Rifles, Fishing Rods, Boxing Gloves, Hunting Coats, Game Bags, Cartridge Belts, Indian Clubs, Dumb Bells, Loaded Shells, Cartridges, Powder, Shot, Bicycles, &c. The wall case is 12 inches deep, lined with black velvet, and will hold a great many goods. The case is provided with sliding glass doors, the first two spaces being devoted to Guns, the next two to Rifles, and the next two to Fishing Rods. Rackets, Masks, Minnow Pails and Fish Baskets are displayed above the cases. Next to the wall case, under the stairway in the angular corner, Loaded Shells, Gun Wads, Loading Tools, &c., are kept. Under the wall case are two rows of drawers used for storing goods out of season. In front of the wall cases is a long counter, with two show cases, for small goods. In the first case is kept Small Fishing Tackle, Artificial Baits, Lines, Reels, &c., and in winter Skates, &c. The next case is used for Revolvers, Bicycle sundries, Duck Calls, Dog Whistles, Gun Cleaners, &c. To the rear of the bags of Shot is a scale for weighing Powder and Shot; next to which is the Shot case and Powder cans. The space under the

of the window 6 inches from the floor, in which are holes bored half way through. This rack holds 18 Rods and has the advantage of keeping them always in sight, and, being put together, they are always ready to show customers.

The show window is 5 x 3½ feet in size, with plate-glass front. This window is always trimmed with sporting and athletic goods; and with frequent and attractive changes, always attracts attention. The firm have thus gained the name of being headquarters on sporting goods. As a result of their window display, they state that when a large tennis club was formed last summer they filled the window with Rackets, Nets, Caps, Sashes, Balls, &c., and had supplied one-half of the members with outfits before their competitors awoke to the fact that a club was being fitted out. They carry about \$2000 worth of sporting goods, and find it a very profitable stock to carry in connection with their Hardware goods. They advise, as the result of their experience, buying the best, as well as cheap and medium grades, of these goods, as they find sportsmen do not object to the price, but want the best of everything.

Logan, Gregg & Co.

LOGAN, GREGG & CO., Pittsburgh, Pa., are sending to their trade an interesting pamphlet, tastefully arranged, entitled "Removal." A page each is given to answering the questions, Who? Why? Where? When? The answers are in substance as follows: The above firm having for several years been doing business at a disadvantage, for lack of room, have removed to a large warehouse built especially for them on Seventh street, between Penn avenue and Allegheny River, the contemplated change being made during March, 1893. An illustration is given of their old stores on Wood street, occupied by them for more than 60 years; and also of their new building, which is a handsome, substantial edifice of six stories. A map is given showing the section of the city in

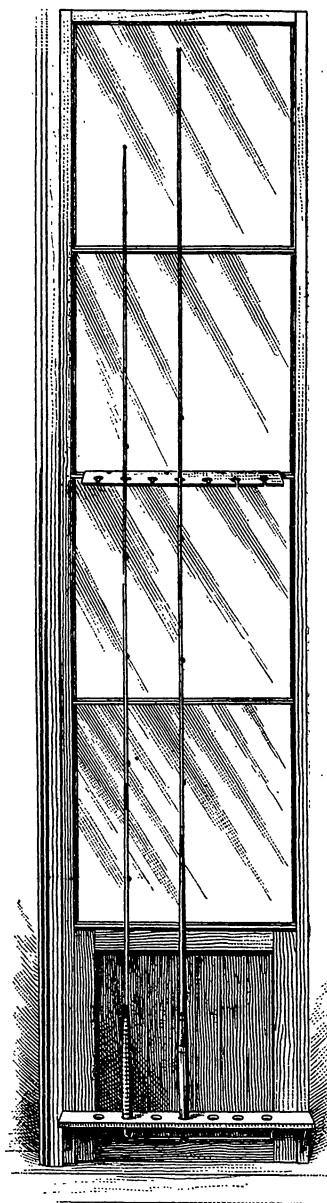


Fig. 769.—Fishing Rod Rack.

which their new quarters are located, also plans of their offices and salesrooms on the first floor and the arrangement of the second floor. The building is furnished with electric lights, heated by steam and provided with elevators. The business was established in 1831 by John T. Logan and Robert T. Kennedy, as Logan & Kennedy. In 1848 the style of the firm changed to Logan, Wilson & Co.; in 1857 to Logan & Gregg, and in 1867 to Logan, Gregg & Co. Pictures are given of John T. Logan and Edward Gregg.

Screen Wire Rack.

WM. KEMPF, 2814 Market street, St. Louis, Mo., has made a Screen Wire rack for his own use, as shown in Fig. 770.

The width of the roll of Wire is numbered on the front of each shelf and the rack is so arranged as to hold all the different sizes. At the bottom of the rack between the uprights are two shelves which may be utilized for odd lengths of Wire, or for other articles that require but little room. The lumber used in its construction was obtained from window-glass boxes, which of course cost nothing, and the labor was equally inexpensive, as the rack was made at times when

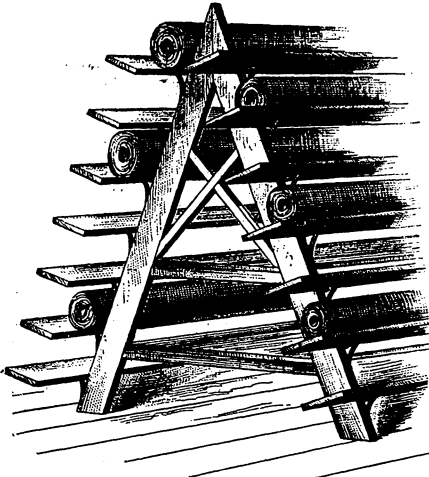


Fig. 770.—Screen Wire Rack.

there was nothing else requiring attention, so that the entire cost consisted of the nails and brackets, probably about 75 cents.

Patterson, Gottfried & Hunter's Catalogue.

PATTERSON, GOTTFRIED & HUNTER, 146 to 150 Centre street, New York, have just issued a large catalogue, representing their stock of Machinery, Metals, Hardware, Tools and Supplies. The book is 10 x 13 inches in size, containing over 500 pages, substantially bound in cloth. Over 1,500 illustrations are shown, together with list prices and valuable tabulated matter; while the arrangement indicates much thought and labor. The index is very complete, occupying 20 pages near the front of the book. A careful study has been made of the requirements of machine shop, factory and mill, so that many goods not usually considered as belonging to these lines are now included. Many of the lists are given in a more compact form than heretofore, while others which were compiled separately are now grouped under one head. Descriptions in words have been so far as possible omitted, the dimensions and list prices being depended upon to give the necessary information, and the phrasing has been reduced to the utmost simplicity consistent with clearness and explicitness. A saving of space has resulted from omitting lengthy descriptions, and by throwing, as far as possible, various tables into one, so that the book contains a large amount of matter, without giving the pages a crowded appearance. Among the goods listed, are Roll and Sheet Brass, Embossed Brass, Perforated Brass, Tin and Copper, Brazed Tubing, Wire, Steel, Screws, Bolts, Nuts, Nails, Tacks, Rivets and Burrs, Milling Cutters, Metal Saws, Gauges, Calipers, Steel Rules, Squares, Drills, Reamers, Taps, Dies, Screw Plates, Files, Checks, Wrenches, Clamps, Cutting-off Tools,

Knurls, Mandrels, Dividers, Pliers, Vises, Chisels, Auger Bits, Carving Tools, Saws, Plumbs and Levels, Gas Burners, Measuring Tapes, Oilers, Fire Pots, Molders' Tools, Gas Blast Furnaces, Forges, Blowers, Lathes, Shapers, Shearing and Punching Machines, Grinding Machines, Pulleys, Gears, Belting, Brushes, Packing, Steam Gauges, Pipe and Fittings, Lanterns, Electrical Goods, Acids, &c. From the foregoing enumeration an idea of the range of the stock may be obtained.

Suggestions as to Improvements in Putting Up Goods.

FIRST ARTICLE.

BY BERNARD B. NEAL.

I TAKE it for granted that manufacturers understand very distinctly that the bulk of their goods are finally sold at retail in small quantities. Also, that it takes a great deal of time and labor to retail enough Hardware to amount to much in the way of money. Hence it is very important that they should study how to save time and labor to the retailer, and certainly the manufacturers have a good chance to save the retailer much time and also to increase sales by simply putting goods up in a good and attractive manner, and not letting a little extra cost stand in the way of doing so. To prove this I will mention some few things that occur to my mind, as follows:

First.—Paper boxes with metal corners should not be used, because after the cover is taken off it is hard to put it on again.

Second.—Good, strong thin paper should be used to wrap up articles that are packed in boxes of dozens, &c. Most of the paper now used is simply of no use whatever. For example, take a box of Locks, Bolts, &c.; take one out of its wrapper and show it to a customer; then try and put it back in its original shape, and you will find that you will have to get a good piece of paper in order to do so. I would suggest that good Japanese paper be adopted for this purpose, as it is thin, tough, and I believe cheap.

Third.—Manufacturers should refrain from putting printed advertisements with their name and address in goods. This is a feature that many of them have adopted, in fact they do up all articles with regular printed paper that informs a jobber's customer just where the goods are made, also that if he writes direct he can probably get a lower price; if this supposition is not a fair one, why do the manufacturers do it? The jobber has a hard enough time as it is to sell goods at any sort of a profit. So I say leave out the advertisements.

Fourth.—Labels should be printed in black letters on a light-colored paper, the numbers and name of articles in as large type as possible so that a person can read the name at a distance: it will often save running for a ladder to see if you have the article on shelf a few feet up. By all means let the old green and red labels go, and give us new, attractive and readable ones.

Fifth.—Labels should be put on in such a manner that none of the reading matter is hid. Sometimes we have goods labeled in such a manner that one must take off

the cover of the box in order to read all of the labels.

Sixth.—This is an age of advancement and improvement, and the Hardware trade are quick to appreciate goods that are put up in such a manner as to make their stores look pleasant to their customers, and I know of no line of goods that will make the same show as an attractive and clean stock of Hardware. The above remarks refer in a general manner to all Hardware. I will now mention some goods that I believe can be improved on, and in the method of putting up:

PADLOCKS

should have their respective Keys tied with good strong twine of suitable length to each lock.

DOOR LOCKS

should be tied up with their respective Keys, Escutcheons and parts in a good manner. I sometimes hope that the day will come when each Lock will be done up in a paper box like Night Latches now are.

CASTERS

are done up very poorly. Why not put them up in sets and then put them in a wooden box, instead of paper, which breaks and lets out the sockets?

WRENCHES

are very heavy, but most of the makers stick to paper, and very poor paper at that; and at the least handling the wrenches break through the paper and look very unsightly, thus time is lost in putting them in shape again. Let them be put in boxes.

THUMB LATCHES.

blind and gate hinges, blind fasts, &c., are very cheap, but I believe they would bring a better price if they were put up nicely. A clerk could sell one complete without losing so much time in finding all the parts. They should be put up in cheap boxes similar to the way the parts of Torrey's door spring are. In any case, have them so that a set can be sold complete without a clerk having to get a catalogue and studying how many pieces belong to a set.

HAND BELLS

would be much nicer in paper boxes instead of plain paper, as now. They are a nice line of goods and would stand being put up in a convenient and tasty manner.

DOOR BOLTS

should be put up better, so that the nosings and screws do not get lost.

BRACES

should be packed in wooden boxes containing $\frac{1}{2}$ dozen, the better quality in nice paper boxes containing one only: a carpenter will think more of it.

SAWS

should be put up better; the good ones in nice strong paper, covering handle and all, so that the teeth cannot be damaged in handling; the outside boxes are about right.

WOODEN PLANES

are very poorly put up; better paper and nice labels would help a great deal.

AUGER BITS

should be wrapped separately and put in wooden boxes, so as to protect the points and thread.

HATCHETS

should be put in wooden boxes containing partition for each hatchet, each blade should be well done up in paper. The using of paper boxes in putting up hatchets has caused many a bad cut to the novice in hardware.

AXES,

unhandled, should be put up in paper boxes of one only, with the edge well protected, and the weights marked on each.

ARTICLES

put up in sets, such as chisels, &c., should have the size marked on the paper of each in a prominent manner, this will save time in finding out the size, &c. I could specify many more things, but think the above the most important, as they worry the retailer to a certain extent every day. The manufacturers may complain about the expense, &c., to them, but I believe they can and will in time do much more than I have named in the way of improvements in putting up hardware. I know that corkscrews are imported from Germany at 18 cents per dozen, put up in a real nice strong package, containing ½ dozen only, and we certainly can put up goods as neatly as any nation on earth.

Reading Hardware Company's Chicago Store.

AMONG the many points of attraction for Columbian Exposition visitors outside of the Exposition grounds will be the new store and sample parlors of the Reading Hardware Company at 73 Wabash avenue. The arrangement of this establishment is admirable, both for the transaction of business and the proper reception of visitors who may merely desire to examine the samples, the former department being separated and entirely distinct from the latter. Facing the avenue is a handsome show window 15 x 28 feet in dimensions containing mounted samples of door locks and a few selections in ornamental goods, with a richly draped curtain in terra cotta velvet for a background. To the left of the window is a doorway 7 feet wide, leading into a spacious vestibule executed in paneled oak, from which the visitor may pass directly into the sample parlor on the right or to the reception room beyond, the various entrances being draped with velvet hangings in neutral tints. The Reception room is a cozy apartment with handsome oak panelings and furnished with an ample settee and large comfortable easy chairs richly carved and upholstered in russet leather. From the reception room, customers or visitors are conducted either to the offices or the sample-rooms as they may elect. The interest of the visitor will be mainly centered in the parlor assigned exclusively to the display of samples. This room is 15 x 28 feet in size, fitted up in Colonial style with parquet floors, partially hidden by Persian rugs and furnished with artistic tables and easy chairs. Around the walls and in the center are sample cases in which goods are ingeniously and tastefully arranged in a profusion of styles, designs and finishes in genuine Bronze, Aluminum and Iron. These samples represent complete lines of the goods manufactured by the Reading Hardware Company. They may be examined at any time by visitors of both sexes or by members of the Hardware trade, who will always be courteously received and warmly welcomed. The packing, shipping and order departments, together with the offices of the company, are all in the rear of the reception and sample-rooms, being separated therefrom by elaborate screens of carved oak.

It Is Reported—

That the Hardware store of Landkamer Bros., Alexandria, Neb., was entered by burglars on the 15th ult., and \$150 in cash and goods stolen.

That the Implement store of J. P. Johnson, Creighton, Neb., was destroyed by fire on the 14th ult.

That the Macon Hardware Company, Macon, Ga., have commenced the erection of a new building, which they will exclusively occupy. The building will be three stories high and will have a frontage of 52½ feet and a depth of 175 feet.

That the Hardware firm of Erickson & Emmons, Ironwood, Mich., have dissolved.

That Harper & Streif, dealers in Hardware, Stoves, &c., Monroe, Wis., have dissolved partnership. Streif & Lewis are successors in the business.

That B. A. Clark, Hardware dealer, Brattleboro, Vt., has disposed of his business to J. E. Mellen and W. H. Proctor. Mr. Mellen has been in the Hardware business for about 15 or 20 years, and was Mr. Clark's head clerk for eight years. Mr. Proctor has also had some experience in connection with the selling of Hardware. Mr. Clark has retired after 43 years' continuous service in Brattleboro mercantile life.

That A. H. Funk has disposed of his Hardware business at Milan, Ohio.

That George Lamkin, Hardware merchant, Norwalk, Ohio, has sold out his business to Butt & Friend. He retires after 21 years' connection with the Hardware trade.

That Harry C. Read, Hardwareman, Bloomington, Ill., was married on the 22d ult. at Indianapolis, Ind., to Miss Minnie Bowman of that city. Mr. and Mrs. Read will make a two months' trip through the South, visiting New Orleans, and will subsequently settle down in Bloomington.

That the Hardware store of Funkhouser & Nash, Zionsville, Ind., was damaged by fire on the 20th ult.

That Frye & Wade, Caliope, Iowa, have sold out their Hardware store.

That G. H. Bantelle has sold out his Hardware stock at Sheldon, Iowa.

That Jacob Bigler & Son, Imperial, Neb., have disposed of their stock of Hardware.

That John Henderson, Hardware merchant, Wheeling, W. Va., has become the owner of the building in which his business is located.

That W. A. Stuart & Co., Hardware dealers, Livermore Falls, Me., are making extensive improvements in their Hardware store.

That Albert C. Burgess, Hardware merchant, Belfast, Me., has taken possession of his handsome new store.

That Walter Stevens of Lisbon Falls, Me., has opened a Hardware store at Lisbon.

That Wicks & Gilbert have opened a new Hardware store at Salem, S. D.

That Green Bros., dealers in Hardware and Implements, are thinking of removing from Denison, Kan.

That William T. Reckner's Hardware store in San Francisco, Cal., was damaged by fire on the 22d ult.

That there is an opening for a Hardware and Implement Store at Cedarville, Kan.

That the store of Whitt & Bonney, Hardware merchants, Lynnville, Tenn., was destroyed by fire on the 26th ult.

That on May 1 a consolidation of the Stove and Tinware stores of C. S. Whitcomb & Co. and Kirkham & Hazen,

Springfield, Mass., will be effected. The new firm style will be Whitcomb, Kirkham & Hazen.

That J. S. Farley, dealer in Hardware and Implements, Milbank, S. D., has been succeeded by Farley & Benedict.

That the firm of Price & Cox, Hardware dealers, Marion, Ind., has been dissolved by mutual consent. The business will be continued by L. K. Price under the style of Price & Co.

CONTENTS.

	PAGE.
The Crane Reversing Engines. Illustrated.	771
World's Fair Notes.	774
The Westward Movement of the Center of Population.	776
The Premier Steel Company.	776
Babcock & Wilcox Boilers Over Puddling and Heating Furnaces. Illustrated.	777
Foundations of the Allis Engine at the World's Fair. Illustrated.	782
The Telautograph. Illustrated.	783
The Scully Steel & Iron Company.	784
The Decline of Boston as a Speculative Center.	784
Capitol Pipe-Threading and Cutting-Off Machine. Illustrated.	785
Diamond-Making and the Electrical Furnace.	785
Coal Dust Explosions as a Motive Power.	785
The Prentice Single-Spindle Drilling Machine. Illustrated.	786
The Merriam Percussion Fuse. Illustrated.	787
Canadian Notes.	789
The Week.	790
Editorials:	
The Consumption of Rails.	791
Competing with England.	791
Activity in Car Building.	791
Gray's Telautograph.	792
Dear Building Material at Chicago.	792
A Wisconsin Strike Law.	792
Obituary.	792
Personal.	793
Washington News.	793
Iron in Colombia.	793
Signaling by Electric Balloons.	794
New Publications.	794
Trade Publications.	795
Manufacturing:	
Iron and Steel.	795
Machinery.	796
Miscellaneous.	796
Trade Report:	
Philadelphia.	797
Cincinnati.	798
Chicago.	798
Louisville.	799
St. Louis.	799
Cleveland.	799
Boston.	800
Metal Market.	800
Financial.	801
Coal Market.	801
New York.	802
Pittsburgh.	802
Baltimore.	803
British Iron and Metal Markets.	804
The German Iron Trade.	804
The Effect of Melting Pig Iron.	804
Hardware:	
Condition of Trade.	805
Notes on Prices.	806
Export Notes.	808
Obituary.	808
Trade Items.	808
Louisville.	809
Local Advertising.	809
Exhibit of Callahan & Douglas. Illus.	810
Tanks for the Manufacture of Window Glass.	810
Sporting Goods Department. Illustrated.	810
Tact in Selling.	811
Sheet Iron Nail Pouches. Illustrated.	811
Manufacturing.	811
Prize Competitions.	812
Bicycles.	812
How to Keep the Store Neat and Clean.	812
John Humphries, Jr.	813
Price-List and Circular Case. Illustrated.	814
Price-Lists, Circulars, &c.	814
After Mexican Trade.	814
Arrangement of Stores. Illustrated.	816
Logan, Gregg & Co.	816
Screen Wire Rack. Illustrated.	817
Patterson, Gottfried & Hunter's Catalogue Suggestions as to Improvements in Putting Up Goods.	817
Reading Hardware Company's Chicago Store.	818
It Is Reported—	818
New Idea Double-Acting Spring Hinge. Illustrated.	819
Columbian Enameled Steel Kitchen Ware.	819
Double-Grip Pencil Clasp. Illustrated.	819
Cycle Starting Gear.	819
Needle-Point Saw. Illustrated.	820
Star Hose Band. Illustrated.	820
Marble Water-Closet Door Hinge Attachment. Illustrated.	820
Waverly Scorchers. Illustrated.	821
Flat-Keyed Automatic Padlock. Illus.	821
Housewives' Delight Can Opener. Illus.	821
Famous Parer and Slicer. Illustrated.	822
Metal Hose Reel. Illustrated.	822
Paints and Colors.	822
Current Hardware Prices.	823
Current Metal Prices.	830

New Idea Double-Acting Spring Hinge.

The illustrations shown herewith represent a double-acting spring hinge being introduced by the Stover Mfg. Company, Freeport, Ill. The hinge is made up of a jamb plate having ears, upon which is hung the leaf. It also has a stationary steel pintle to swing on, and it is impossible, it is stated, for the door to sag. As shown in Figs. 1 and 2, the hinge divides at the center (pintle line) by removing

enamel, it is remarked, differs slightly in appearance from other enameled ware on the market.

Double-Grip Pencil Clasp.

Wm. H. Jacobus, 90 Chambers street, New York, is offering the above device, as illustrated herewith. The wedging action of the compass causes the clasp to grip the pencil rigidly, and a fine adjustment for the size of the circle is obtained

Cycle Starting Gear.

We learn from a contemporary that one of the novelties at the National Cycle Show in London was a starting gear. It is described as a contrivance for enabling the rider to mount and start without "pushing off" or hopping—expedients which are very trying to beginners, and especially to ladies. The gear is actuated by a powerful spring, and can be fitted to any type of machine and to any revolving

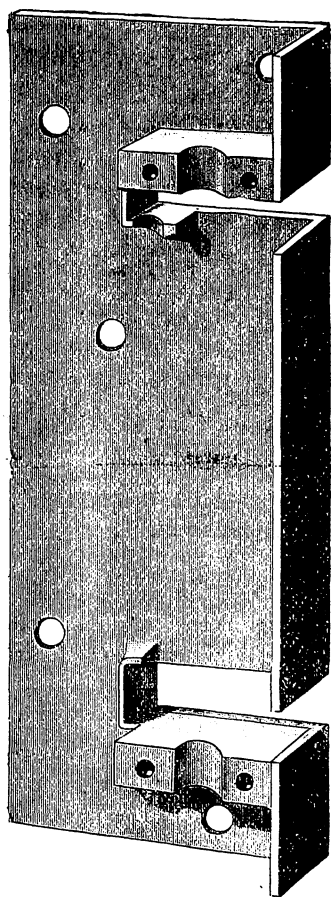


Fig. 1.—Hinge Divided at the Pintle.

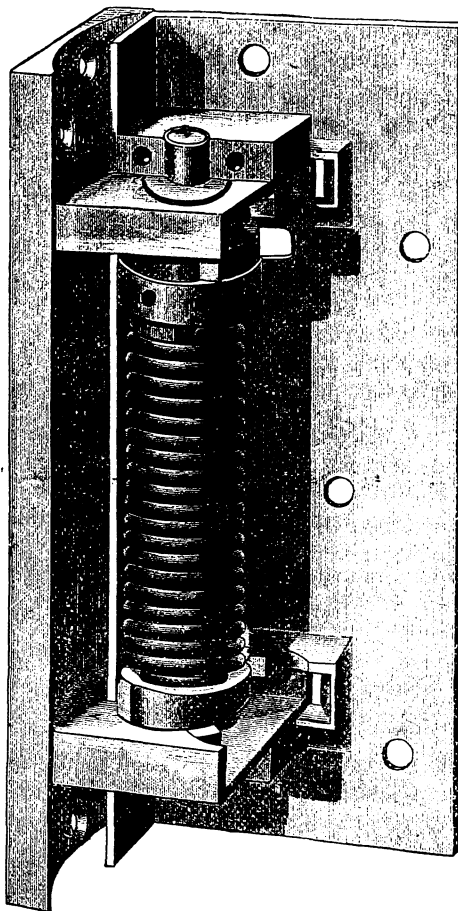


Fig. 2.—Leaf of Hinge in Position.

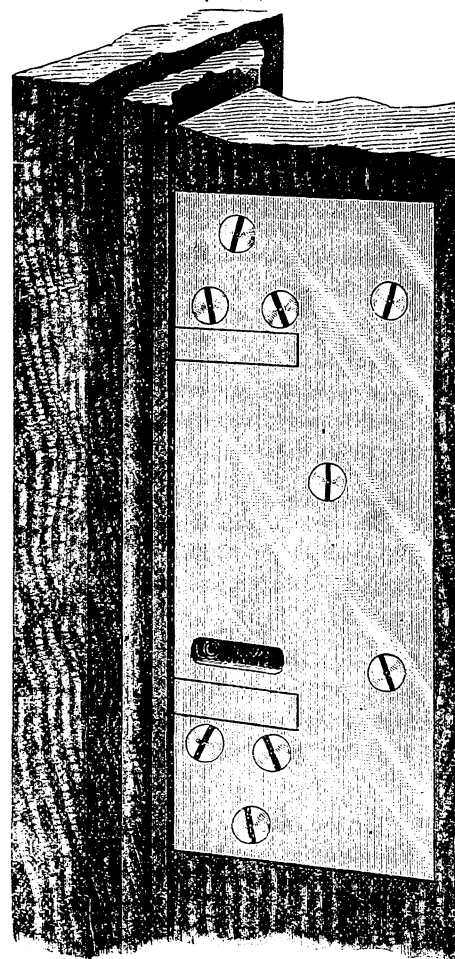


Fig. 3.—Double-Acting Spring Hinge Applied to Door.

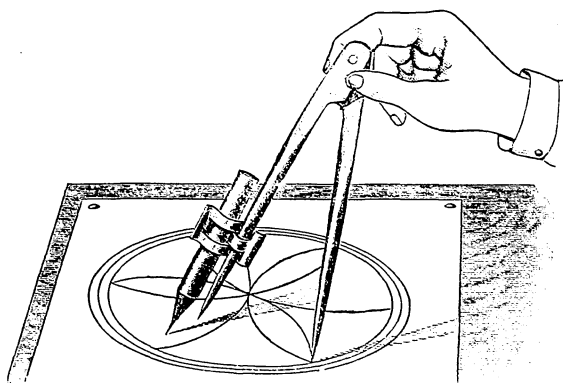
four screws. This arrangement, the makers remark, makes it easy to fit the leaves to the door, and to attach the jamb plate to the jamb. Attention is called to the fact that it is not necessary to round off the edge of the door, as the jamb plate and strip is concave, allowing the corners of the door to pass through the circle of concave; also that the rear joint of the door is always covered, whether the door is partly or wholly open or closed. The working parts of the hinge are confined entirely within the jamb plate, Fig. 3, admitting, it is claimed, of its being taken apart and applied to the door with ease, and without danger of injury to the workman. Fig. 3 also shows the hinge as applied to the door, and gives a top and side view of the concave strip attached to the jamb. The hinges are made in japan and ornamental finishes, and in sizes for doors from $\frac{1}{4}$ to 3 inches thick.

Columbian Enameled Steel Kitchen Ware.

Bellaire Stamping Company, Harvey, Ill., are manufacturing a line of these goods, noticeable among which are tea and coffee pots. These are made with both tin and enameled covers. The

by turning the clasp on the compass leg. The pencil may be easily adjusted in the clasp by loosening the clasp on the compass leg. The point is made that the clasp when attached to a pencil prevents it from

part, preferably to the crank axle or the driving wheel. The spring is released automatically as the rider mounts the machine, and impels it a distance sufficient to enable the rider to settle himself (or



Double-Grip Pencil Clasp.

rolling off the desk, and also serves as an eyelet for attaching a string. The clasp is made of rolled brass, nickel plated, and is designed for use on compasses or trammels, and for machinists, carpenters and draftsmen; also for use in schools.

herself) comfortably and to find the pedals. The inventor also claims that the gear can be made to serve as a temporary assistance in ascending hills. This may fairly be classed among the ludicrous inventions which hinder rather than aid riders. As

the tendency is toward lighter machines each year, and these machines stripped of all unnecessary parts, the device is not likely to come into favor.

Needle-Point Saw.

The S. A. Haines Company, corner Second and North Alabama streets, Indianapolis, Ind., are introducing saws with needle-point teeth, as shown in Fig. 1. It is remarked that the needle point saw is constructed upon a new principle which

which makes the cutting teeth run freely; that the cutting teeth in the needle-point saw do not have to run as deep in the wood as the cutting teeth in a saw where square or common raker teeth are used, and that the needle-point raker tooth keeps the saw in the center of the cut, making the saw run steady and without rattling. Cross-cut, one-man cross-cut, hand and wood saws are made with needle-point teeth. It is stated that the needle-point hand saw is adapted for ripping, cross cutting and miter sawing, doing all kinds of sawing smoother and more easily

arrangement, it is stated, allows the end of the band to draw over it uniformly from both sides. The manufacturers claim that there are no sharp ends to destroy the covering of the hose or to imbed themselves, thus preventing the tightening of the screw; that there is no strain whatever on the adjustable piece; that the bands are carefully formed, uniform in shape and size; that there is no surplus metal in them, and that the screw would break before the band would give. The screw is adjusted with a screw driver. These bands are made for hydrant, also for steam

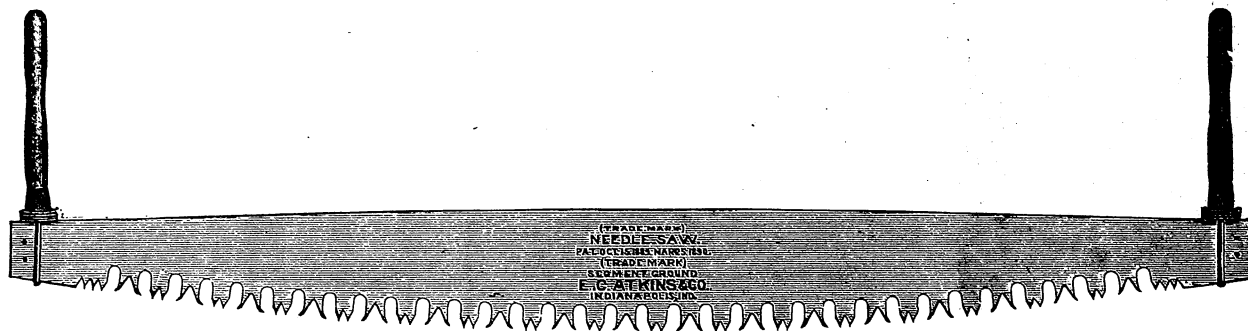


Fig. 1.—Needle-Point Saw.

enables the saw to do satisfactory work either for cross cutting or for ripping. The needle-point raker teeth are made as long as the cutting teeth, after which the points of the raker teeth are turned, as shown in Fig. 2, making them a trifle shorter, as shown in Fig. 3. A bevel is

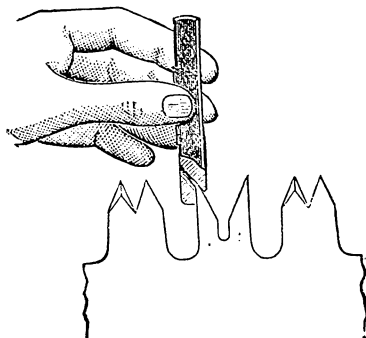


Fig. 2.—Turning the Raker Teeth.

filed on each side of the raker tooth, which, having the point turned forward, forms a cutting edge on each side of the raker, which, it is stated, will make a sliding cut instead of a square cut. It is explained that this causes the saw to run easy in rip-

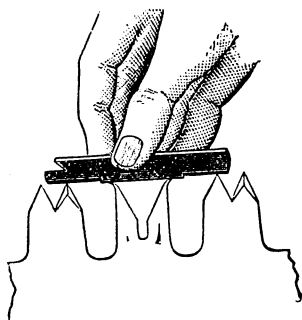


Fig. 3.—The Teeth in Detail.

ping and in cross cutting; if the grain of the wood or knots should run lengthwise in the cut, and the cutting teeth could not cut them out, the needle point raker teeth will do the work. The manufacturers claim that the raker teeth will clean out the dust as deep as the cutting teeth,

than can be done with the ordinary saws which do only one class of work.

Star Hose Band.

Syracuse Specialty Mfg. Company, Syracuse, N. Y., are putting the hose band herewith illustrated upon the market.

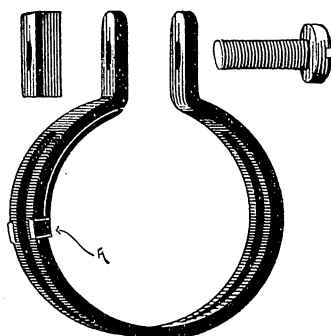


Fig. 1.—Star Hose Band.

The bands are made of rolled strip steel, plain or coppered; well adapted, it is remarked, to this use on account of its tensile strength. The piece A, Fig. 1, is adjustable, and slides out of position when the

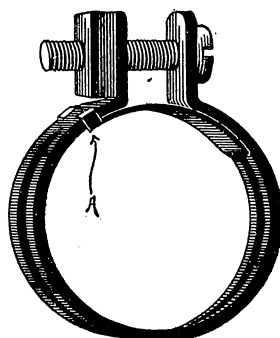


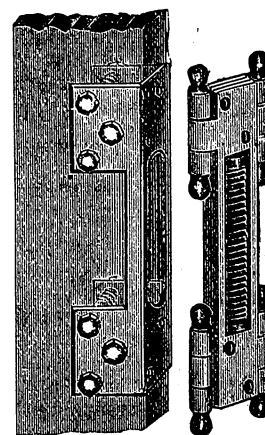
Fig. 2.—As Adjusted on Hose.

band is being placed on the hose, obviating the necessity of spreading the band enough to destroy its form. After the band is in place on the hose the adjustable piece is slid into position, Fig. 2. This

and brewer's hose, from $\frac{1}{4}$ inch to $2\frac{1}{2}$ inches.

Marble Water-Closet Door Hinge Attachment.

Chicago Spring Butt Company, Union Park Place and Carroll avenue, Chicago, Ill., are offering the above attachment, as illustrated herewith. The attachment is made for the hinges and blanks of the Chicago spring butts, so that a door may be hung with a pair of hinges; or with a



Marble Water-Closet Door Hinge Attachment.

hinge and blank, when one hinge is strong enough to open the door. As the doors are of wood it requires the attachment only for the marble partitions, the hinge being attached to the wood door, as in ordinary cases. The attachments are made in sizes corresponding to their various sized spring butts, and are supplied in brass or bronze metal, and in finish to match other manufacturers' goods. The point is made that though the attachments are more suited to the Chicago spring butts, they can be used with other makes, by drilling the screw holes in them to match those in the attachment.

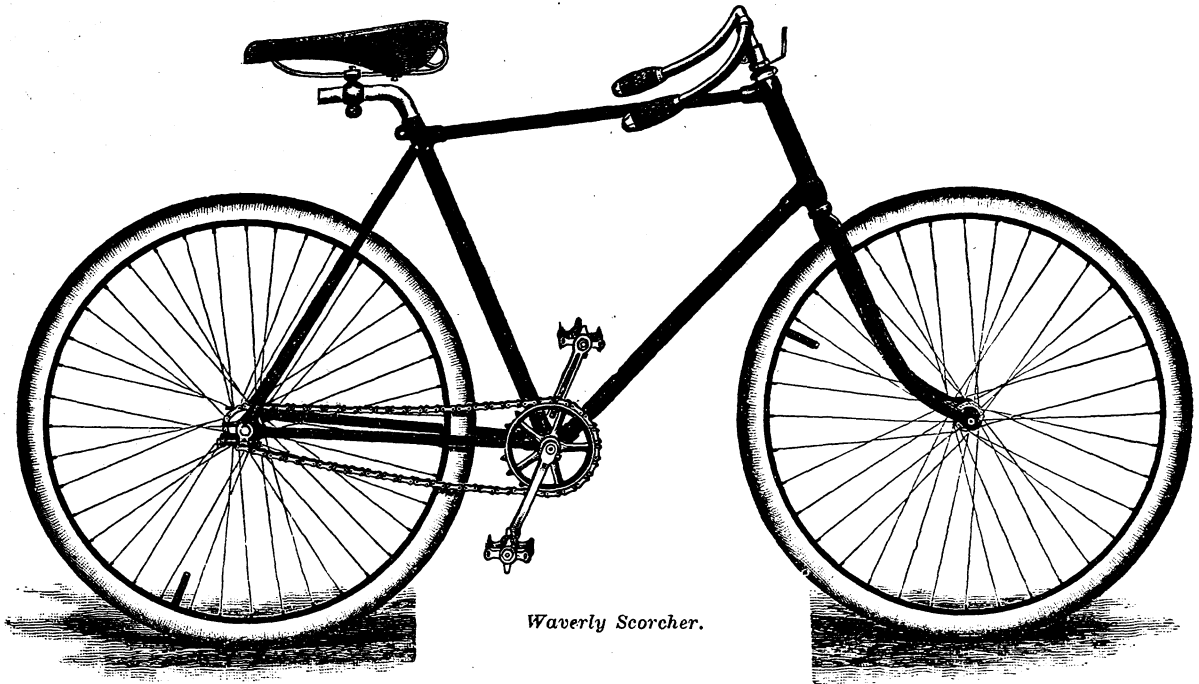
The establishment of two new transatlantic lines this season, one from Rotterdam and the other from Stettin, the latter with Gothenburg connections, will add important trade facilities.

Waverly Scorchers.

The machine illustrated herewith is being introduced by the Indiana Bicycle Company, Indianapolis, Ind. The material

locking, the shackle is turned to its original position, when it springs down in place, automatically fastening the lock. The locks weigh about $\frac{1}{2}$ pound, and each has four levers, with 168 changes avail-

THE CLINTON WIRE CLOTH COMPANY, Clinton, Mass., have a new mill in which they are putting looms for weaving Window Screen Cloth. The company have recently increased the force in the



used in the construction of the wheel is described by the manufacturers as being of the best grade throughout; imported seamless steel tubing for frame and forks, drop steel forgings for all the solid parts, piano wire for spokes, imported Swedish steel for the rims, while the bearings are turned up from tool steel. The bicycle is being put on the market by the manufacturers as a strictly high-grade machine in every particular, at a list price lower than is usual for a wheel of this class. The above company state that they have a capacity for building 40,000 machines per year.

Flat-Keyed Automatic Padlock.

Miller Lock Company, Frankford, Philadelphia, Pa., are introducing the lock of which a full-size cut is herewith shown.

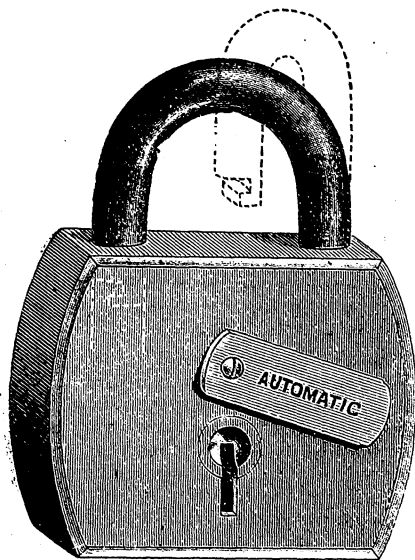


Fig. 1.—Flat-Keyed Automatic Padlock.

Upon turning the key, as illustrated in Fig. 2, for unlocking, the shackle springs around at right angles to the lock. In

able. The locks may be ordered in sets, special to pass a sample key, keys alike to pass, or with more than 50 changes. The locks are made in steel, dark finished,

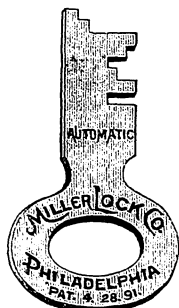


Fig. 2.—Key for Automatic Lock.

with two keys, No. 406; also in brass, bright finished, with two keys, No. 407.

Housewives' Delight Can Opener.

The accompanying cuts illustrate a can opener being put on the market by F. E. Kohler & Co., Canton, Ohio. It is described as being made from the best malleable iron, with steel knives adjustable to

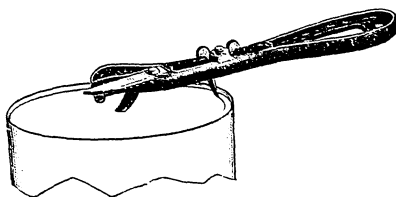


Fig. 1.—Housewives' Delight Can Opener.

any size of can, and as cutting smoothly and without exertion. It combines openers suitable for round and square cans with a skewer puller, as shown in Figs. 1, 2 and 3.

machine shop to upward of 30 men, who are now busily engaged in getting out the new looms. The estimated increase in production will exceed 10,000,000 square feet per annum. We are also advised that the Westinghouse Company of Boston are putting in the works two dynamos

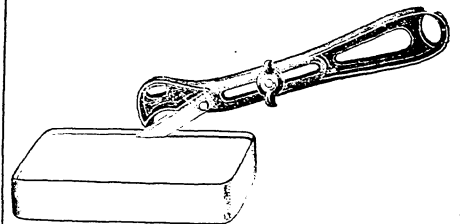


Fig. 2.—Adapted to Square Cans.

by which the seven mills will be equipped with incandescent lights. The company are running double turn in several of their mills and on the fine weaving a very steady light is necessary, for if a wire breaks it must be seen instantly or the fabric weaving is liable to be ruined.

THE KEYSTONE MFG. COMPANY, 312 Terrace, Buffalo, N. Y., in their advertisement in this issue illustrate the Nonpareil Ratchet Wrench, which is described

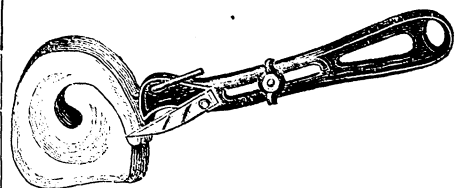


Fig. 3.—As Skewer Puller.

as made of the best forged tool steel. These Wrenches can be made reversible instantly without removing from the work by throwing over the lever in slot of the handle.

Famous Parer and Slicer.

The paring and slicing knife which the accompanying cut illustrates is being introduced by Charles F. Sperry, Herman, Mo. The knife is made of one piece of refined steel, providing two blades, one for cutting and the other for paring and slicing. The point of the knife is designed to remove the eyes of potatoes and the side of the blade to remove the decayed parts of fruits or vegetables. The point is made that the construction of the blade enables following the curves or uneven surfaces of

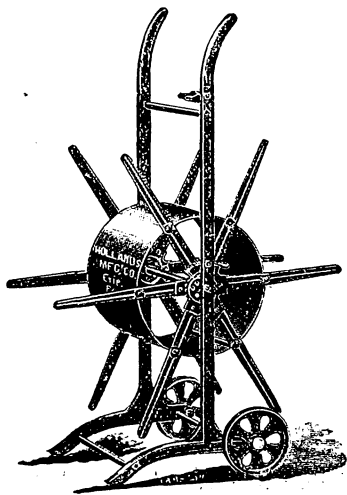


Famous Parer and Slicer.

the fruits or vegetables upon which it is used, as well as straight surfaces. The maker claims that by the use of the knife 5 to 10 per cent. of the peel is saved, and equally as much time; that the forefinger is not made callous or the thumb cut; that an even peel is taken off and that the blade is easily cleaned. It is designed for use on potatoes, carrots, parsnips, turnips, squash, apples, pears, quinces and firm peaches.

Metal Hose Reel.

The accompanying cut represents a reel manufactured by The Hollands Mfg. Company, Erie, Pa. The cylinder is made of heavy galvanized sheet iron, and is provided with an automatic attachment which allows it to revolve or to remain fixed, as desired. The other metal parts, with the exception of the wheels, are of malleable



Metal Hose Reel.

iron, designed for rough usage. There is a nozzle holder attached to one of the handles, in connection with which is a spring for holding the hose firmly in place. The wheels are made larger than shown in the cut, to allow them to run freely and easily over lawns and walks. We are advised that the reels are painted and varnished in an attractive manner. Accommodation is provided by the reel for 150 feet of garden hose.

Mr. Powderly apprehends that the decision of the judges in Toledo and New Orleans will "revolutionize the labor movement and make necessary a complete change of tactics." He thinks that a policy more peaceable than strikes would be more effective.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Although not as large in volume as might be expected, the distribution of most lines of Paints and Colors is quite brisk and indicative of a good average trade for the season. Local and nearby

demand has figured with particular prominence, being to all accounts heavier than at any previous time since the opening of the season, but country orders make a very good showing, all told. In prices no radical changes have taken place, but slight irregularities on some of the more staple goods still exist, and the market is hardly as firm as could be desired, despite the good volume of business passing. Thus far, however, the movement of prices has been within narrow bounds, and most conspicuous in the instance of low grade products.

White Lead.—Good orders have been secured for popular brands of pure pigment, and the sale of the cheaper varieties is represented as being fully up to expectations, making in all a liberal volume of business. Demand keeps up well, particularly from city and nearby trade, and the appearances are that, while somewhat tardy in developing, the spring season movement will make a bright showing. "Outside" corrodors in the West and in New England are still rather aggressive, but the "trust" prices are not cut to a greater extent than about $\frac{1}{4}$ cent per pound, and then chiefly in territory where the "outside" competition is keenest. Mixed Leads of the better class hold their own in the current movement and remain quite steady as to price, while the inferior descriptions, used chiefly for sizing, seem to fare very well.

Red Lead and Litharge.—For high grade product employed in the Paint trade there is still a good steady demand, and the common grade used by Glass-makers and in other manufacture meets with full movement. Prices stand about the same as they have been for a month or six weeks past.

Zincs.—List prices for American Oxide have undergone no change, and quantity discounts are unaltered. Some reports have it, however, that the market is not as steady as surface appearances would indicate. In fact, it is rumored that small orders have been taken at the minimum price generally quoted for 10-ton lots. In foreign brands there is little doing outside of the routine distribution, and prices remain without decided change, although rather weak in the instance of the cheaper varieties that come in closest competition with domestic product.

Colors, &c.—For the general line of Dry Colors there has been a good seasonable demand. Competition keeps prices low and somewhat irregular, but no radical changes are reported for the past week. Oil Colors are in about the same position. Ready-mixed Paints are moving out quite freely, and the volume of business is fully up to the spring season average.

Oils and Turpentine.

The most prominent feature has been a further sharp decline in price of Lard Oil, due to lower market for raw material. This, in turn, has operated to weaken the market for competing products, and, along with depression in the market for

Greases generally, has served to weaken Cotton-Seed Oils. At present the situation in the several lines is very unsettled, and business is held in abeyance to greater or less extent pending developments. In Oils not directly affected by the conditions above outlined, there have been few and only unimportant changes, but business is rather slow in nearly all departments, and hardly in line with the usual volume for this season of the year.

Linseed Oil.—There has been a good steady demand, and, in contrast with the experience in several other lines of Oils, the distribution is running quite as full as usual at this season of the year. In fact, most reports are to the effect that sales have been heavier the past week than at any time since the spring season opened. Competition is temperate at the moment, and prices therefore remain very steady, although the market for Seed has weakened considerably.

Cotton Seed Oils.—Dealings in both Crude and Refined product have been on a very moderate scale. There is little, if any, export interest, speculation is lifeless, and, being well stocked, large consumers are extremely indifferent. Values, naturally, are somewhat depressed, but no decided changes have taken place except on "off"-grade product, the supply of which appears to be comparatively large. The difference between prices for the latter and for prime quality are as great as 6¢ @ 8¢ per gallon, against a customary margin of 2¢ @ 3¢, indicating a particularly poor market for the inferior product.

Lard Oil.—City pressers have dropped their price for prime quality Oil to 87¢, and sellers of out-of-town products have made a similar reduction. The decline is due chiefly to lower cost of raw material, but lack of orders and consequent accumulation of supplies, due to extremely high prices, is not without some bearing on the market. Current quotations are comparatively high, but closer to actual cost than prices have been for some time past.

Fish Oils.—There has been little movement in Crude, Sperm, Whale or Menhaden Oil, and the position of the market for the goods is unchanged. The manufactured products are selling to quite the average extent in ordinary jobbing parcels and command full former prices. Cod Oils are in very firm position but not quoted higher.

Red Oils.—For these goods the demand has been very slow, and the market is at present in somewhat uncertain condition, being affected more or less by the irregularity in the market for other soap-making material.

Miscellaneous.—Common Olive Oil in barrels has been slow, and prices are rather weak, at from 63¢ to 64¢ for spot parcels, down to 60¢ for round lots for future shipment. Coconut Oils have been very slow and the market is easy, without, however, any positive change in prices. Palm Oil is dull and rather weak.

Spirits Turpentine.—Prices have declined still further, reaching 33¢ for regular and 33 $\frac{1}{2}$ ¢ for machine barrels. Cheaper prices have led to freer buying, however, and liberal deliveries have reduced yard stocks to the extent of about 650 barrels during the week.

The report of the secretary of the British Iron Founders' Society for 1892, just issued, presents a gloomy showing. The year is reported to have been a very trying one for the trade, 13 $\frac{1}{2}$ per cent. of the members having been idle. The opinion is given that the best remedy for the evil is the adoption of an eight-hour day.

The New Jersey Iron & Steel Company of Trenton, N. J., are just completing four 440-foot spans, double track, for the Bellefontaine bridge over the Missouri river, near St. Louis. Shipment will be completed within three weeks, and it is expected that the bridge will be open for traffic next fall.

Current Hardware Prices.

APRIL 5, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic..... \$ doz \$3.00, 33½¢
Excelsior..... \$ doz \$10.00, 50&10&22
North's..... list net @ 10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Eagle Anvils, \$ 9¢..... 15&15&5
Peter Wright's..... 11&11½
Armstrong's Mouse Hole..... 10¢@11
Am. Wrought, Horseshoe brand, 11¢@11½
Trenton..... 10¢@11
Wilkinson's..... 10¢@11
Barnes Mfg. Co..... 33½¢

Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20%
Cheney Anvil and Vise..... 25%
Allen Anvil and Vise \$3.00..... 40&10%
Star..... 45&5%

Apple Parers—See Parers Apple, &c.

Augers and Bits—

Common Augers and Bits..... 70%
Boring Machine Augers..... 70%
Car Bits, 12-in. twist..... 50%
Russell Jennings' Augers and Bits 25&10%
Jennings' Pattern Car Bits..... 40%
Jennings' Pattern Auger Bits..... 60&5%
Snell's Bits..... 60&5%
C. E. Jennings & Co., No. 10, extension
Up..... 40%
C. E. Jennings & Co., No. 30..... 60%
C. E. Jennings & Co., Auger Bits, set,
32½ quaters, No. 5, \$5; No. 8, \$3.50, 25%
Lewis' Patent Single twist..... 20%
Fugate's Black..... 30%
Fugate's Jennings Pattern..... 30%
L'Hommedieu Car Bits..... 15&10%
Forster Pat. Auger Bits..... 15%
Cincinnati Bell-Hangers' Bits..... 30&10

Bit Stock Drills—

Morse Twist Drills..... 50&10&5%
Standard..... 50&10&5%
Cleveland..... 50&10&5%
Syracuse, for metal..... 50&10%
Syracuse, for wood (wood list) 30&30&5%
Cincinnati, for wood..... 30&10%
Cincinnati, for metal..... 45&10%

Expansive Bits—

Clark's small, \$18; large, \$26. 35&35&10%
Ives' No. 4, \$ doz \$90..... 40%
Sears' No. 1, \$28; No. 2, \$18..... 35&40%
Sears' No. 2, \$48..... 20%

Gimlet Bits—

Common..... \$ gross \$2.75 @ \$3.25
Diamond..... \$ doz \$1.25..... 40&10%
Bee..... 25&25&5%
Double Cut, Shepardson's..... 45&45&10%
Double Cut, Ct. Vail Mfg. Co., 30&10%
Double Cut, Bartwell's, \$ gro., \$5.00, 25%
Double Cut, Douglass'..... 40&10%
Double Cut, Ives..... 60&60&10%

Hollow Augers—

Ives'..... \$ 33½ @ 33½
French, Swift & Co. (Beecher)..... 50%
Douglass'..... 50%
Bonney's Adjustable, \$ doz \$48..... 20&10%
Ives' Expansive, each \$1.50..... 60&5%
Universal Expansive, each \$4.60..... 20%
Wood's..... 25&25&10%
Cincinnati Adjustable..... 25&10%
Cincinnati Standard..... 25&10%

Ship Augers and Bits—

L'Hommedieu's..... 15&10@15&10&5%
Watrous'..... 25&25&10%
Snell's..... 15&10@15&10&5%
Snell's Ship Auger Pat'n Car Bits,
15&10@15&10&5%

Awl Hafts—See Hafts, Awl.

Awls—

Awls, Sewing, Common..... \$ gr. 85¢ @ 90¢
Awls, Should, Peg..... \$ gr. \$1.50 @ \$1.55
Awls, Pat. Peg..... \$ gr. 85¢ @ 88¢
Awls, Shouldered Brad..... \$ gr. \$1.30 @ 1.40
Awls, Handled Brad..... \$ gr. \$2.50 @ \$3.00
Awls, Handled Scratch..... \$ gr. \$4.00 @ \$4.50
Awls, Socket Scratch..... \$ doz. \$1.10 @ \$1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

First quality, best brands, \$7.00..... 6.50
First qual., other brands..... 6.75
Second quality..... 5.50 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1..... 3¼¢ @ 4¼¢, No. 2, 5¢ @ 6¢
Nos. 7 to 14..... 60&10%
Nos. 15 to 18..... 47½¢
Nos. 19 to 22..... 70%
Concord Axles, loose collar..... 4¼¢ @ 6¢
Concord Axles, solid collar..... 5¼¢ @ 7¢
National Tubular Self Oiling..... 33½¢ @ 33½¢ & 5%

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... No. 2000 20 40%
Chatillon, \$ doz..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40%
Chatillon Circular Balances..... 50&10%

Barb Wire—See Wire, Barb.

Bars—

Cast Steel..... \$ doz 3¼¢
Iron, Steel Points..... \$ doz 3¼¢

Basins, Wash—

Standard Fiberware, No. 1, 10¼-in., \$1.80;
12-inch, \$2.00; 13¼-inch, \$2.50; 15-inch,
\$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82..... 50&10%
Chatillon's No. 1..... 50&10&5%
Chatillon's No. 2..... 50%
Custer's..... 33½¢

Beaters—

Egg—
Dover..... \$ doz \$1.00 @ \$1.20
Duplex (Standard Co.)..... \$ doz \$1.00
Dover (Standard Co.)..... \$ doz \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ doz \$3.50
Bryant's..... \$ gross \$14.00
Double (H. & R. Mfg. Co.), \$ gro., No. 0
\$12.00; No. 1, \$15.00; No. 2..... \$36.00
Easy (H. & R. Mfg. Co.)..... \$ gro \$21.00
Triple (H. & R. Mfg. Co.)..... \$ gro \$16.50
Spiral..... \$ gro \$4.25 @ \$4.50
Improved Acme (H. & R. Mfg. Co.)..... \$ gro \$5.00
Silver & Co..... \$ doz \$5.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2..... 20%

Bells—

Cow—
Common Wrought..... 60&10%
Western, Sargent's list..... 70&10%
Kentucky, "Star"..... 20&10%
Kentucky, Sargent's list..... 70&10%
Kentucky Durham..... 70&10%
Dodge, Genuine Kentucky..... 70&10%
Texas Star..... 60&10@50&10&5%

Door—

Gong, Abbe's..... 33½¢ @ 10%
Gong, Yankee..... 45&10%
Gong, Barton's..... 40&10%
Crack, Brooks'..... 50&10&2%
Crack, Cone's..... 10%
Crack, Connel's..... 20&10%
Lever, Sargent's..... 60&10%
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10%
Lever, R. & E. Mfg. Co.'s..... 50&10&2%
Pull, Brooks'..... 50&10&2%

Electric—

Wollensak's..... 20%
Bigelow & Dowse..... 20%

Hand—

Light Brass..... 70&10@70&10&5%
Extra Heavy..... 70%
White..... 70%
Silver Chime..... 33½¢ @ 10%
Globe Cone's Patent..... 25&10&35%

Miscellaneous—

Call..... 45&50%
Farm Bells..... \$ 33½ @ 33½
Steel Alloy Church and School Bells..... 40%

Bellows—

Blacksmiths'..... 60&10&5@60&10&10%
Molders..... 40&10&50%
Hand Bellows..... 40&10&50%

Belting, Rubber—

Common Standard..... 70&10@75&5%
Standard..... 70&5@70&10%
Extra..... 60&10@60&10&5%
N.Y.B. & P. Co., Carbon..... 60%
N.Y.B. & P. Co., Diamond..... 50%
N.Y.B. & P. Co., Para..... 40%

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Stoddard's Lightning Tire Upsetters..... 15%
Detroit Perfected Tire Bender..... 15%
Green River Tire Benders and Upsetters..... 20%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.,
see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron. 50&60&10%
Moore's Novelty, Mal. Iron..... 50%
Sure Grip Steel Tackle Blocks..... 25%

Bolts—

Carriage, Machine, &c.—

Comm. list June 10, '84..... 75&10&5@80%
Genuine Eagle, Norway, list Oct. '84..... 80&5@80&10%
Eagle, Norway, list Oct. '84..... 80&10@80&15%
Phila. pattern, list Oct. 7, '84..... 80%
R.B. & W., old list..... 70%
Machine, list Jan. 1, 1890..... 80&10%
Bolt Ends, list Jan. 1, 1890..... 80&10%

Door and Shutter—

Cast Iron Barrel, Square, &c..... 70&10%
Cast Iron Shutter Bolts..... 70&10%
Cast Iron Chain (Sargent's list)..... 65&10%
Ives' Patent Door Bolts..... 60&10@60&10&5%
Wrought Barrel..... 70&10@75%
Wrought Square..... 70&10@75%
Wrt Shutter, all iron, Stanley's..... 60&10@60&10&10%
Wrt Shutter, Sargent's list..... 60&10%
Wrt Sunk Flush, Sargent's list..... 60&10%
Wrt Sunk Flush, Stanley's list..... 50&10&5%
Wrt B. K. Flush, Common..... 55&10%

Stove and Plow—

Stove..... 60&10@60&10&5%
Plow..... 60&10@50@60&10&10%
R. B. & W., Plow..... 55%

Tire—

Common, list Feb. 28, '83..... 65&65&5%
Port Chester Bolt and Nut Company:
Empire list Feb. 28, '83..... 65%
Keystone, Philadel., list Oct. '84..... 80%
Norway, Phila., list Oct. '84..... 75%
American Screw Company:
Norway, Phila., list Oct. 16, '84..... 75%
Eagle, Phila., list Oct. 16, '84..... 80%
Philadel., list Oct. 16, '84..... 80%
Bay State, list Feb. 28, '83..... 65%
R. B. & W., Philadel., list Oct. 16, '84..... 80%

Borers, Tap—

Common and Ring..... 20&10%
Ives' Tap Borer..... 33½¢ @ 5%
Enterprise Mfg. Co..... 20%
Clark's..... 33½¢ @ 35%

Borax—

Per lb..... 9¢ @ 10% & 14%

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per doz..... 23½¢

Braces—

American Bit Brace and Tool Co..
Nos. 10, 12, 20..... 60&10%
Nos. 11, 21, 24, 27..... 70&10%
Nos. 22, 23, 25..... 60&10&5%
Nos. 13, 26, 36, 37..... 70&10&5%
Amid's.....
Barker's Imp'd Plain..... 75&10@80%
Barker's Imp. Nickeled..... 65&10@70%
Ratchet..... 75&10@80%
Eclipse Ratchet..... 60%
Globe Jawed..... 40&40&10%
Corner Brace..... 40&40&10%
Ratchet, Nickeled..... 40&10&50%
Buffalo Ball..... \$1.10 @ \$1.15
Barber's..... 50&10%
Saxton's.....
Barker's Imp. Polished..... 75&10@80%
Barker's Imp. Nickeled..... 65&10@70%
Ratchet, Polished..... 50&10@60%
Ratchet, Nickeled..... 40&10&50%
Buffalo Ball..... net, \$1.10 @ \$1.15
Bartholomew's.....
Nos. 25, 27 and 30..... 60&10@60&5%
Nos. 117, 118, 119..... 70&70&5%
Common Ball, American..... \$1.00 @ \$1.10
Fray's Genuine Safford's..... 50&5@50&10%
Fray's Nos. 70 to 120, \$1 to 125, 20¢ to 41¢
50&10%

Ives' New Haven Novelty—

70&70&5%
New Haven Ratchet..... 60&5@60&10%
Barber Ratchet..... 60&5@60&10%
Barber's..... 60&5%
Spofford..... 60&5@60&10%
P. S. & W. Co., Peck's Patent..... 50%
Rose & Johnson..... 50%
Davis Patent..... 50&10%

Brackets—

Shelf, plain.....
Regular list..... 65&70%
Sargent's list..... 60&10@70&10%
Shelf, fancy.....
Sargent's list..... 70&70&10%
Other makes at a wide range of prices.
Bradley Shelf Brackets..... 70&10%

Bright Wire Goods—See Wire.

Broilers—

Hen's Self-Inch..... 9 10 9x11
Basting..... Per doz. \$4.50 5.50 6.50
New Haven..... 50%
Wire Goods Co..... 65&10%
Morgan Odorless..... \$ doz. \$12, 50%
Queen City..... 33½¢

Buckets, Well—

Galvanized—

Hill's..... \$ doz. 12 qt. \$4.25; 14 qt. \$5.25
Iron Clad..... \$ doz. 14 qt. \$4.25 @ \$4.50
Helwig's Flat Iron Band..... \$3.75
Helwig's Wired Top..... \$ doz \$4.00

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers Butchers'

Brass—

Wrought Brass..... 80&80&10%
Cast Brass, Tiebout's..... 50%
Cast Brass, Fast..... 33½¢ @ 10%
Cast Brass, Loose Joint..... 33½¢ @ 10%

Cast Iron—

Fast Joint, Narrow..... 50&10&5@60%
Fast Joint, Broad..... 50&10@60%
Loose Joint.....
Loose Joint, Japanned.....
Loose Joint, Jap. with Acorns.....
Parliament Butts..... 75&75%
Mayer's Hinges..... 210%
Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned.....
Loose Pin, Acorns, Japanned,
Plated Tips.....

Wrought Steel—

Fast Joint, Narrow.....
Fast Joint, Lt. Narrow.....
Fast Joint, Broad.....
Loose Joint, Broad.....
Table Butts, Back Flaps, &c.....
Inside Blind, Regular.....
Inside Blind, Light.....
Bronze Pin.....
Bronzed Wrought Butts..... 50@50&10%

Callipers—See Compasses.

Calks, Toe—

Gautier, One Prong, Blunt..... 51¢ @ 60¢
Burke's One Prong, Blunt..... 51¢ @ 60¢
Burke's Two Prong, Blunt..... 74¢ @ 85¢
Burke's One Prong, Sharp..... 64¢ @ 75¢

Can Openers—See Openers, Can.

Cans, Milk—

S. S. & Co.: 5-gal., \$2.10; 8-gal., \$3.10;
10-gal., \$3.35 each..... 25%

Caps—

Percussion—

Hicks & Goldmark's and Union Metallic
Cartridge Co. \$ 100%
F. L. Waterproof, 1-10's..... 35¢ @ 37¢
E. B. Trimmed Edge, 1-10's..... 47¢ @ 50¢
E. B. Grnd. Edge, Cent. Fire, 1-10's..... 47¢ @ 50¢
Musket, Waterproof, 1-10's..... 50¢ @ 53¢
G. D..... 27¢ @ 30¢
S. B. Genuine Imported..... 45¢
Tley's E. B..... 56¢ @ 58¢
Eley's D Waterproof, Central Fire..... \$1.00

Primers—

Berdan Primers, \$1.00..... 25%
B. L. Caps (Sturtevant Shells) \$1.00..... 25%
All other Primers, \$1.20..... 25%

Cards—

Watson's Cotton, Wool, Horse and
File, list January 28, 1891..... 25%

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Rim Fire Cartridges..... 50&5&2%
Rim Fire Military..... 15&2%
Cent. Fire, Pistol and Rifle..... 25&5&2%
Cent. Fire, Military and Sporting..... 15&5&2%

Blank Cartridges, except 22 and 32 cal.,
additional 10% to above discounts.....

Blank Cartridges, 22 cal., \$1.75..... 25%

Blank Cartridges, 32 cal., \$3.50..... 15&5&2%

Primed Shells and Bullets..... 15&5&2%

B. B. Caps, Round Ball, \$1.75..... 25%

B. B. Caps, Cent. Ball, Swgd., \$2.00..... 25%

Carpet Sweepers—

See Sweepers, Carpet.

Casters—

Bed..... } Brass..... 55¢ @ 55&10%
Plate..... } Others..... 60¢ @ 60&10%
Shallow Socket.....
Deep Socket..... 40&10%
Martin's Patent (Phoenix)..... 45&10@50&10%
Tucker's Patent, low list..... 45%
Payson's Antifiction..... 70¢ @ 70&10%
Payson's Truck..... 60¢ @ 60&10%
Yale Casters, low list..... 45%
Yale, Gem..... 70%
Giant Truck Casters..... 35%
Stationary Truck Casters..... 50&10%
Socket Truck Casters..... 50¢ @ 50&10%
Gwinner's Common Sense..... 45%
Gwinner's Hercules..... 45%

Cattle Leaders—

See Leaders, Cattle.

Cement—

Victor Elastic..... 5 pails \$ 5.50

Chain—

Trace, Wagon and Fancy Chains,
List revised Oct. 15, 1892..... 60¢ @ 60&10%
American Coil, in cask lots,
3.18 ¼ 5.18 ¾ 7.18 ¾
\$7.00 5.30 4.45 3.80 3.65 3.50 3.40 3.30
Less than cask lots, add 4¢ @ 4¢ @ 5¢
German Coil, list July 12, 1892..... 60&10%
German Halter Chain, list July 12, 1892..... 60¢ @ 60&10%

Cover Halters..... 60&2%
Cover Traces..... 35&2%
Cover Heel Chain..... 50&2%
Galvanized Pump Chain..... (See Trade Report.)

Onelda Halter Chain..... 60¢ @ 60&2%
Jack Chain, Iron and Brass, list March
10, 1893..... 60&10%
Barnes' Reinforced Sash..... 60&10%
Barnes' Victor Sash..... 65%

Chalk Lines—See Lines.**Chisels—****Socket Framing and Firmer**

P. S. & W.	
New Haven	
Wetherby	.75&10@75&10&25
Mix	
Ohio Tool Co.	
Douglass	.75@75&5
Buck Bros.	.30
Merrill	.60&10@80&10&5
L. & I. J. White	.30@30&5

Tanged and Miscellaneous.

Tanged Firmer	.50@50&10
Butcher's	\$.475@50.00
Spears & Jackson's	\$.50 to 2
Buck Bros.	.30
Cold Chisels, # D.	.15@16

Chucks—

Beach Pat.	each, \$8.00
Morse's Adjustable, each	\$7.00, 20@20&5
Danbury	each, \$6.00, 30@30&5
Syracuse Balz Pat.	.25
Graham Patent	.33&4
Skinner's Patent Chucks	
Combination Lathe Chucks	.33&4
Universal Lathe Chucks	.40
Independent Lathe Chucks	.40
Drill Chucks	.15
Union Mfg. Co.	
Victor	\$.85, 25
Combination	.40
Universal	.40
Independent	.40

Churns—

Timin Union, each, 5 gal.	\$3.25; 7 gal., \$3.75; 10 gal., \$4.25.
McDermald Star Barrel Churn, each	6 gal., \$2.60; 10 gal., \$2.75; 15 gal., \$3.00; 20 gal., \$3.25.

Clamps—

R. I. Tool Co.'s Wrought Iron	.25
Adjustable, Cincinnati	.15&10
Adjustable, Hammers	.15@15&5
Adjustable, Steam's	.30@30&10
Steam's Adjustable Cabinet and Corner	.30@30&10
Cabinet, Sargent's	.70&10
Carriage Makers', Sargent's	.75@75&5
Carriage Makers', P. S. & W. Co.	.40&10
Eberhard Mfg. Co.	.40&10@40&10&5
Warner's	.40&10@40&10&5
Saw Clamps, see Vises, Saw Filers	
Carpenter's, Cincinnati	.25&10
Barnes' Machinists' Clamps	.33&4

Cleavers, Butchers'—

Bradley's	.25@30
L. & I. J. White	.20&5
Beatty's	.40@40&5
New Haven Edge Tool Co.'s	.40
P. S. & W.	.33&4@33&4&10
Foster Bros.	.30
Schulte, Lohoff & Co.	.40@40&5

Clips—

Norway, Axle, 1/4 & 5-16	.55&5&5
24 grade Norway Axle, 1/4 & 5-16	.65&5
Superior Axle Clips	.60&5@70
Norway Spring Bar Clips, 5-16	.60&5&5
Wrought Iron Felloe Clips	# D, 5
Steel Felloe Clips	# D, 5
Baker Axle Clips	.25

Cloth and Netting, Wire—**—See Wire, &c.****Cockeyes—****Cocks Brass—****Hardware list****Coffee Mills—See Mills, Coffee.****Collars, Dog—****Chapman Mfg. Company****Medford Fancy Goods Co.****Embossed, Gilt, Pope & Steven's list****Leather, Pope & Steven's list****Brass, Pope & Steven's list****Combs, Curry—****Fitch's****Rubber, per doz., \$10.00****American Curry Comb Co.****Kohler's Magic Oscillating****Kohler's Humane****Compasses, Dividers, &c.****Compasses, Callipers, Dividers, 70&10&10****Bemis & Call Co.'s****Dividers****Compasses****Callipers, Wing and Inside or Outside****Callipers, Double****Callipers, Call's Patent Inside****Excelsior****J. Stevens & Co.'s****Starrett's****Spring Callipers and Dividers****Lock Callipers and Dividers****Combination Dividers****Coolers, Water—****S. S. & Co.****Coopers' Tools—****See Tools, Coopers.****Cord—****Sash—****Common****Patent, good quality****White Cotton Braided, fair****Common Russia Sash****Patent Russia Sash****Patent Laid Italian Sash****India Cable Laid Sash****Silver Lake****A quality, White, 50****A quality, White, 55****B quality, White, 30****B quality, White, 35****Sylvan Spring, Extra Braided, White****Sylvan Spring, Extra Braided, Drab****Semper Idem, Braided, White****Egyptian, India Hemp, Braided****Massachusetts, White****Samson—****Braided, White Cotton****Braided, Drab Cotton****Braided, Italian Hemp****Braided, Linen****Tate's Solid Braided—****Hercules, White****Hercules, Drab****Economy Drab****Economy White****Ossawa Mills—****Braided, Giant, White****Braided, Giant, Drab and Fancy****# 35****Strained, Crown White, # D, 50****Strained, Crown Drab and Fancy, # D, 50****Wire Picture—****Braided or Twisted****Corkscrews—See Screws, Cork.****Cork Knives and Cutters****See Knives, Cork.****Crackers, Nut—****Table (H. & B. Mfg. Co.)****Blade's Pattern, # doz., \$2.00****Turner & Seymour Mfg. Co.****Acme****Japanned, # gro., \$30****Nickel Plated, # gro., \$30****Cradles—****Grain****Crayons—****White Crayons, # gross****D. M. Stewart Mfg. Co., Metal Work****ers', # gross, \$2.50****D. M. Stewart Mfg. Co., Rolling Mill****# gross, \$2.50****See also Chalk.****Creamery Pails—See Pails, Creamery.****Crow Bars—See Bars, Crow.****Curry Combs—****See Combs, Curry.****Curtain Pins—****See Pins, Curtain.****Cutters—****Meat—****Dixon's, # doz.****Nos.****Woodruff's, # doz.****Nos.****Hale's Pattern, # doz.****Nos.****American****Nos.****Each****Enterprise****Nos.****Each****Great American Meat Cutter****Nos.****Each****Miles' Challenge, # doz.****Nos.****Home No. 1, # doz.****Draw Cut, each****Nos.****Beef Shavers (Enterprise)****Little Giant (P. S. & W. Co.)****Chadborn's Smoked Beef Cutter, # doz.****Tobacco****Champion****All Iron****Nashua Lock Co.'s, # doz.****Wilson's****Sargent's****Acme****Smith's Pat.****Johnson's****Penny's****Appleton's****Bonney's****Cincinnati****Washer—****Smith's Pat.****Johnson's****Penny's****Appleton's****Bonney's****Cincinnati****Dampers, &c.—****Dampers, Buffalo****Buffalo Damper Clips****Proton Damper****Excelsior****Diggers, Post Hole, &c.—****Samson****Fletcher Post Hole Augers, # doz.****Eureka Diggers****Vaughan's Post Hole Auger, # doz.****Kohler's Little Giant****Kohler's Hercules****Kohler's Invincible****Kohler's New Champion****Schneider****Cronk's Post Bars****Gibb's Post Hole Digger****Gibb's National****Gibb's Columbia****Gibb's Imperial****Shimer's Hollow Handle****Dividers—See Compasses.****Dog Collars—See Collars, Dog.****Door Springs—****See Springs, Door.****Drawers.****Money, # doz.****Drawing Knives—****See Knives, Drawing.****Drills and Drill Stocks—****Blacksmith's****Blacksmith's Self Feeding****Crast, P. S. & W.****Breast, Wilson's****Breast, Millers Falls****Breast, Bartholomew's****Ratchet, Merrill's****Ratchet, Ingersoll's****Ratchet, Parker's****Ratchet, Whitney's****Ratchet, Weston's****Ratchet, Moore's Triple Action****Ratchet, Curtis & Curtis****Whitneys Hand Drill, Plain****Adjustable, \$12.00****Automatic Boring Tools****Chicopee Automatic Drill****Twist Drills—****Cleveland****Diamond, W. & B.****Graham's Pat. Groove Shank****Morse****New Process****Standard****Syracuse (M. list)****Drill Bits or Bit Stock****Drills—See Augers and Bits.****Drill Chucks—See Chucks.****Dripping Pans—****See Pans, Dripping.****Drivers, Screw—****Douglas Mfg. Co.****Buck Bros.****Stanley R. & L. Co.'s****No. 64, Varnished Handles****No. 86****Sargent & Co.'s****No. 1, Forged Blade****No. 2, 10 and 60****P. S. & W.****Knapp & Cowies****No. 1****No. 2****No. 3****Nos. 4 and 00, Acme and Ideal****Stearns****Gay & Parsons****Champion****Clark's Pat.****Crawford's Adjustable****Elrich's Socket and Ratchet****Alford's Spiral, new list****Kolb's Common Sense****Syracuse Screw Driver Bits****Screw Driver Bits****Screw Driver Bits, Parr's****Fray's Hol. H'dle Sets****P. D. & Co.'s All Steel****Brace Screw Drivers****Buck Bros. Screw Driver Bits****Goodell's Automatic****Mayhew's Black Handle****Mayhew's Monarch****C. T. Williamson Wire Novelty Co.****Egg Beaters—See Beaters, Egg****Egg Poachers—****See Poachers, Egg.****Electric Bell Sets—****See Bells, Electric.**

Halters—

Covert's Rope, Jute.....60&10&10&25
Covert's Rope, 7-16 in. Jute.....70&25
Covert's Rope, 1/4 in. Hemp.....50&25
Covert's Ad. J. Rope Halters.....40&25
Covert's Hemp Horse and Cattle Tie.....60&10&25
Covert's Jute Horse Ties.....70&25
Covert's Jute Cattle Ties.....70&10&25
Covert's Ad. J. Web Halters.....35&25
Covert's Saddlery Works Halters.....35&25
Covert's Saddlery Works Horse and Cattle Ties.....35&25

Hammers—

Handled Hammers—

Maydole's, list Dec. 1, '85.....25&10&35
Buffalo Hammer Co.....50&10
Hudson & Beckley.....50&10
Atha Tool Co.....40&10
Verree.....40&10
C. Hammond & Son.....40&10
Fayette R. Plumb.....40&10
Artisan's Chisel, A. E. Nail.....40&10
Regular Y. & P. A. E. Nail.....40&10
Horseshoe Turning Hammers.....50
Other Hammers.....50&10
Cheney's Claw.....40&10
Cheney's Machinist's & Riveting.....50&25
Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....30&10
Nelson Tool Works.....40&10
Warner & Nobles, new list.....25&10
Peck, Stow & Wilcox.....35&40
Sargent's.....40&10&10

Heavy Hammers and Sledges—

8 lb and under.....\$4.40 75&10&75&10
3 to 5 lb.....\$3.90 65
Over 5 lb.....\$5.00 85
Wilkinson's Smiths.....10&10&11&10

Handcuffs and Leg Irons

—See Police Goods.

Handles—

Cross-Cut Saw Handles—

Athlins, new list.....40
Champion.....15
Ely's Perfection.....\$ doz., \$3.00

Iron, Wrought or Cast—

Door or Thumb.....
No. 1 2 3 4
Per doz.....\$0.90 1.00 1.08 1.35 1.50
Roggin's Latches.....\$ doz 70¢ net
Bronze Iron Drop Latches.....\$ doz 70¢ net
Jap'd Store Door Handles.....Nuts, \$1.25
Plate, \$1.10; no plate, \$0.88
Barn Door, \$ doz \$1.40.....10¢ net
Chest and Lifting.....70¢ net

Wood—

Saw and Plane.....40&10&50
Hammer, Hatchet, Axe, &c.....40&10&50
Brad Axl.....\$ gr \$2.00
Hickory Firmer Chisel, ass'd.....\$ gr 4.50
Hickory Firmer Chisel, large.....\$ gr 5.00
Apple Firmer Chisel, ass'd.....\$ gr 5.00
Apple Firmer Chisel, large.....\$ gr 5.00
Socket Firmer Chisel, ass'd.....\$ gr 3.00
Socket Framing Chisel, ass'd.....\$ gr 5.00
J. B. Smith & Co.'s Pat File.....50¢
File, assorted.....\$ gr 2.50
Auger, assorted.....\$ gr 7.00
Pat. Auger, Ives'.....30&10
Pat. Auger, Douglass.....\$ set \$1.25
Pat. Auger, Swan's.....\$ set \$1.00
Hoe, Rake, Shovel, &c.....60&10&50

Hangers—

Barn Door, old patterns.....70¢ net
Barn Door, New England.....70¢ net
Samson Steel Anti-Friction.....55¢
Orleans Steel.....55¢
Hamilton Wrought Steel Track.....55¢
Champion.....60&10
Climax Anti-Friction.....55¢
Zenith for Wood Track.....55¢
Sterling.....50&10&60
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$18.00.....60&25
Kidder's.....50&10&10
Boss.....60&10&60
Best Anti-Friction.....60&10&60
Duplex (Wood Track).....60&10&60
Terry's Modern.....50&10&60
Terry's Ideal.....50&10&60
Terry's Solid.....50&10&60
Terry's Shield.....50&10&60
Terry's Wrought Single Strap.....50&10
Cronk's Patent Steel Covered.....50&10
Carrier Steel Anti-Friction.....50&10
Richards.....30&10
Lane's New Standard.....50&10&60
Lane's Standard.....50&10&60
Lane's Parlor.....40¢
Warner's Pat.....20&10&10
Stearns' Anti-Friction.....20&10&10
Stearns' Challenge.....25&10&10
Cincinnati, Nos. 1, \$2.25; 3, \$2.60; 4, \$2.50.
Paragon, Nos. 5, 6, 7 and 8.....20&10
Crescent.....60&10&10
Nickel Steel, Nos. 0, \$25; 1, \$20; 2, \$15.
Chicago Anti-Friction.....30&10
Star.....40&10&40
Barry.....50
Interstate.....50&10&60
Pendulum, Payson's.....40&10&10
Woody.....45¢
Economy, \$5.00.....50&10
Perfection.....50&10&50

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.....
Blood's.....40 & 10
Hunt's.....50&10
Hurd's.....50&10
Mann's.....40 & 10
Peck's.....40 & 10
Underhill's.....50&10
Buffalo Hammer Co.....50&10
Fayette R. Plumb.....50&10
C. Hammond & Son.....50&10
Kelly's.....50&10
Sargent's & Co.....50&10
F. S. & W. Co.....50&10
Ten Eyck Edge Tool Co.....50&10
Collins.....10
Schulte, Lohoff & Co.....50&10

Hay and Straw Knives—

See Knives.

Hinges—

Blind Hinges—

Parker.....75&25
Huffer.....50¢
Clark's, Nos. 1, 3, 5, 40 and 50.....60&10&50
Clark's Mortise Gravity.....50¢
Sargent's, Nos. 1, 3, 5, 11, 12, 13, 75&10
Reading's Gravity.....75&10&75&10
Shepard's.....75&10
Noiseless.....75&10
Ningars.....80¢
Buffalo.....80¢
Clark's Genuine Pattern.....80¢
O. S., Lull & Porter.....75&10
Acme, Lull & Porter.....75¢
Queen City Reversible.....70&10&75
Clark's, Lull & Porter, Nos. 0, 1, 2, 3, 5, 7, 10, 12, 13, 75&10
North's Automatic Blind Fixtures, No. 2, for Wood, \$9.00; No. 3, for Brick, \$11.50.....10¢

Gate Hinges—

Western.....\$ doz \$4.20, 60&10&10
N. E. Reversible.....\$ doz. \$5.60, 60&10&10
Clark's, Nos. 1, 2, 3.....60&10&50
N. Y. State.....\$ doz \$4.90, 60&10&10
Automatic.....\$ doz \$12.50, 50¢
Shepard's.....60&10&50

Spring Hinges—

Geer's Spring and Blank Butts.....40¢
Union Spring Hinge Co.'s list.....
March, 1886.....20¢
Barker's Double Acting.....25¢
Union Mfg. Co.....25¢
Tommer's.....30¢
Buckman's.....15¢
Chicago.....20¢
Bardsley's Patent Checking.....15¢
Acme.....30¢
U. S.....25&10
Empire and Crown.....20¢
Hero and Monarch.....55¢
American, Gem and Star.....20¢
Oxford.....65¢
Royal.....60¢
Reliable.....60¢
Champion.....60¢
No. 10 Matchless.....60¢
No. 25 Unbreakable.....60¢
J. G. C. Covered, \$ gro., \$30.....60&50
Samson.....60&10
Devore, No. 1.....\$ gro., \$13.00
Rex.....\$ gro., \$13.00
Freeport.....\$ gro., \$12.00
New Idea Nos. 1 and 10.....\$ gross \$13.00
Ideal No. 3.....\$ gross \$10.00
Stearns' Noiseless Floor Hinge.....\$ set, \$5.00.....20&10&30

Wrought Iron Hinges—

List February 14, 1891.
Strap and T.....50&10&50&10&50
Corrugated Strap and T.....50&10&50
Screw Hook and.....6 to 12 in., \$ D. 4¢
Strap.....14 to 20 in., \$ D. 3¢
22 to 36 in., \$ D. 3¢
Screw Hook and Eye.....1 1/2 in., \$ D. 5¢
Rolled Blind Hinges, Nos. 32 and 34.....50&10
Rolled Blind Hinges, Nos. 232 and 234.....55&10
Rolled Plate.....70&10
Plate Raised.....70&10
Plate Hinges, 8, 10 & 12 in., \$ D. 5¢
"Providence" over 12 in., \$ D. 4¢

Hoes—

Eye—

D. & H. Scovill.....20¢
Lane's Crescent, Planter's Pattern.....45¢
Lane's Razor Blade, Scovill Pattern.....30¢
Maynard, S. & O. Pat.....45¢
Sandusky Tool Co., S. & O. Pat.....70¢
Am. Axe and Tool Co., S. & O. Pat.....5¢
Chattanooga Tool Co., S. & O. Pat.....60¢
Grub.....60&10

Handled—

Garden, Mortar, &c.....70¢ net
Planter's, Cotton, &c.....70¢ net
Warren Hoe.....60&10
Magic.....\$ doz \$4.00

Hog Rings and Ringers—

See Rings and Ringers—

Hoisting Apparatus—

See Machines, Hoisting.

Hollow-Ware—

See Ware, Hollow.

Holders—

Bag—

Sprenkle's Pat.....\$ doz \$18.....60¢

Bit—

Extension.....
Barber's, \$ doz \$15.00.....40&10&10
Ives, \$ doz \$20.00.....60&50&60
Diagonal.....\$ doz \$24.00, 40¢
Angular.....\$ doz \$24.00, 40¢

File and Tool—

Balz Pat.....\$ doz \$4.00, 25¢
Nicholson File Holders.....20¢

Hooks—

Cast Iron—

Bird Cage, Sargent's List.....60&10&10
Bird Cage, Reading.....60&10&10
Clothes Line, Sargent's list.....60&10&10

Clothes Line, Reading list.

Ceiling, Sargent's list.....55&10&10
Harness, Reading list.....55&10&10
Coat and Hat, Sargent's list.....55&10&10
Coat and Hat, Reading.....50&10&50

Wrought Iron—

Cotton.....\$ doz \$1.25
Cotton Pat. (N. Y. Mallet and Handle) Wks.....30¢
Tassel and Picture, T. & S. Mfg. Co.....50¢
Wrought Staples, Hooks, &c.....See Wrought Goods

Wire—

Wire Coat and Hat, Gem, list April, 1886.....80¢
Wire Coat and Hat, Miles, list April, 1886.....50¢
Indestructible Coat and Hat.....45¢
Wire Coat and Hat, Standard.....60¢
Steady Hat and Coat.....50&10&60
Steady Ceiling Hooks.....50&10&60
Belt.....80&15&80&20
Atlas, Coat and Hat.....60¢
Williamson's Bird Cage Hooks, list April, 1882.....40¢
Bright Wire Goods—See Wire.

Miscellaneous—

Grass, No. 2, \$2.00; No. 3, \$2.10; No. 4, \$2.25
Nolin's Grass.....\$ doz \$2.25
Bush.....55¢
Whittemore—Patent.....55¢
Hooks and Eyes—Malleable Iron.....70¢
Hooks and Eyes—Brass.....60&10&10
Fish Hooks, American.....50¢
Bench Hooks—See Bench Stops.

Horse Nails—See Nails, Horse

Horse Shoes—

See Shoes, Horse.

Hose, Rubber—

Competition.....75¢
Standard.....60&10&10
Extra.....60¢
N. Y. B. & P. Co., Para.....25¢
N. Y. B. & P. Co., Extra.....40¢
N. Y. B. & P. Co., Dundee.....50&10&60

Huskers—

Blair's Adjustable.....\$ gr \$8.00
Blair's Adjustable Clipper.....\$ gr 7.00
Hubbard's Solid Steel.....\$ gr 4.50

Indurated Fiber Ware—

See Ware, Indurated Fiber.

Irons.

Sad—

From 4 to 10, at factory.....\$ 100 D.
Self-Heating.....\$23.00
Self-Heating Tailors.....\$ doz \$8.00
Enterprise Iron list Jan. 17, 1893.....\$18.00
Enterprise Star Irons, list Jan. 17, '93.....30¢
Crown.....60&10&60
Ideal Irons, new list.....50&10&50
Salamanca Irons.....25¢
B. B. Sad Irons.....3¢
Chinese Laundry (N.E. Butt Co.).....15¢
New England.....5¢
Mahony's Troy Pol. Irons.....25¢
Sensible, list Jan. 91.....50&10&50
Sensible Tailor's Irons.....33¢
National Self-Heating.....30¢

Soldering—

Soldering Coppers.....\$ D 19@21¢
Covert's Adjustable, list Jan. 1, 1886.....35¢
Tinker's Dread.....\$ doz \$1.75; \$ gr. \$18

Pinking—

Pinking Irons, \$ doz., 55¢ 60¢.

Jack Screws—See Screws.

Jacks, Wagon—

Daisy.....33¢
Victor.....33¢
Lockport.....40¢

Kettles—

Brass, Spun, Plain, list Jan. 1, '91.....25¢
Brass, Spun, Pld. W. M. list Jan. 1, '91.....20¢
Stamped Brass Kettles.....\$ D 21¢
Enameled and Tea—See Ware, Hollow.
Keys—
Lock, Ass'n list Dec. 30, 1886.....65&10&70
Eagle, Cabinet, &c.....33¢
Ames' Butcher Knives.....40¢
Hotchkiss' Brass Blanks.....40¢
Hotchkiss' Copper and Tinned.....40¢
Hotchkiss' Pad. and Cab.....35¢
Wollensak Tinned.....50&10

Knife Sharpeners—

See Sharpeners, Knife.

Knives—

Butcher, Shoe, &c.

Wilson's Butcher Knives, list Dec 8, 1890.....25¢
Ames' Butcher Knives.....25¢
Foster Bros. Butcher, &c.....40¢
Jordan's A. A. Butchers', list.....net
Nichols' Butcher Knives.....40&10
W. W. Wilson, Butcher, 6 in., \$2.00; 7 in., \$2.70; 8 in., \$3.30, &c.....20¢
Ames' Shoe Knives.....\$ doz \$1.50, 15¢
Moran's Shoe and Bread.....20¢
Hay and Straw—See Hay Knives.
Table and Pocket—See Cutlery.

Corn—

Bradley's.....10¢
Wadsworth's.....25¢

Drawing—

Witherby.....75¢
P. S. & W.....75¢
Mlx.....75¢
New Haven.....60&10&60
Merrill.....75¢
Douglass.....75¢
Watrous.....15&10&25

L. & J. White.....20&25
Bradley's.....35¢
Adjustable Handle.....25¢
Wilkinson's Folding.....25¢

Hay and Straw—

Lightning, from Jobbers.....\$8.00@89.00
Wadsworth's.....40¢
Carter's Needle.....\$ doz. \$11.00@11.50
Heath's.....\$ doz. \$13.00@13.50
Nolin's Hay.....\$ doz. \$7.00@8.00

Mincing—

Am. (2d quality), \$ gr., 1 blade, \$7
2 blades, \$12; 3 blades, \$13.....net
Lothrop's.....20&10
Smith's, \$ doz., Single, \$2; Double, \$4.....45¢
Knapp & Cowles.....50&10&60
Buffalo Adjustable.....\$ doz. \$3.00, 33¢

Knobs—

Door, Mineral.....60¢
Door, Por. Jap'd.....70¢
Door, Por. Nickel.....\$2.00@2.25
Door, Por. Plated Nickel.....\$2.00@2.25
Drawer, Porcelain.....60&10&60
Hemacite Door Knobs.....40&10&50
Yale & Towne Wood, list Dec., 1885.....40¢
Base, Rubber Tip.....70&10&50
Picture, Judd's.....60&10&10
Picture, Sargent's.....70&10
Picture, Hemacite.....35¢
Shutter, Porcelain.....65¢
Carriage, Jap.....\$ gr 80¢, 60&10
Bardsley's Wood Door, Shutter, &c.....15¢

Ladders.

Davies Extension and Single.....20&50

Ladies—

Melting, Sargent's.....60&60
Melting, Reading.....35&10
Melting, P. S. & W.....35&10
Melting, Warner's.....30¢

Lanterns—

Tubular—

Regular, with Guard.....\$ doz \$3.50
O. K., with Guard.....\$ doz \$3.75
Side Lift, with Guard.....\$ doz \$4.00
Square Lift, with Guard.....\$ doz \$4.25
Anti-Friction, with Guard.....\$ doz \$4.50
Brass Plated, Sq. Lift, Guard.....\$ doz \$5.50
Cop. Plated, Sq. Lift, Guard.....\$ doz \$5.50

Bull's Eye Police—

2 1/2-inch regular.....\$ doz \$3.60
3-inch regular.....\$ doz \$3.90
2 1/2-inch flash light.....\$ doz \$4.00
3-inch flash light.....\$ doz \$4.50

Lawn Mowers—

See Mowers, Lawn.

Leaders, Cattle—

Humason, Beckley & Co.'s.....70¢
Sargent's.....70&10&70
Hotchkiss.....30¢
Peck, Stow & W. Co.....60&10

Lemon Squeezers—

See Squeezers, Lemon.

Lifters, Transom—

Wollensak's:
Class 3 and 4, Bronzed Iron.....60¢
Class 3 and 4, Bronze Metal.....50¢
Class 3 and 4, Brass.....50¢
Skylight Lifters.....35¢
Reiter's, list Dec. 20, 1891.....60&10
Bronzed Iron Rods.....60&10
Brass, Real Bronze or Nickel Plate.....30¢
Excelsior.....50&10
Shaw's.....50&10
Payson's:
Universal.....60¢
Solid Grip.....60&10
Imperial.....50&10

Lines—

Cotton and Linen Fish.....50¢
Chalk.....60¢
Mason's Linen, 84 ft., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.25; No. 4, \$2.75; No. 5, \$3.25.....25¢
Cotton Chalk.....55¢
Samson Cotton, No. 4, \$2; No. 4 1/2, \$2.50.....10¢
Silver Lake, Braided No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50.....25¢
Mason's Linen, No. 3 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50.....45¢
Mason's Colored Cotton.....45¢
Wire Clothes.....18 19 20
100 ft.....\$3.50 \$3.00 \$2.50
Ventilator Cord, Samson Braided, White or Drab Cotton.....\$ doz \$7.50, 20¢
Ossawa Mills, Chalk, Twisted 60¢; Chalk, Soft Braided, 60¢ Chalk, Braided, 25¢.

Links, Open—

Terry's—per gro:
Nos.....\$8.00 8.00 12.00 16.00

Locks, &c.—

Cabinet—

Eagle, Gaylord Par- list March, '84, rev. ker and Corbin.....Jan. 1, '85, 33¢
Deitz, Nos. 36 to 39.....40¢
Deitz, Nos. 51 to 63.....40&10
Deitz, Nos. 87 to 96.....40¢
Champion Night Latches.....40¢
Barnes Mfg. Co.....40&10
Eagle and Corbin Trunk.....25&10
Champion Cab. and Combin.....33¢
Yale.....net prices
Romer's.....25¢

Door, Locks, Latches, &c.—

R. & E. Mfg. Co., list Mar. 20, 1889.....65&10
Mallory, Wheeler & Co., list July, '88.....lower net prices
Sargent & Co., list Aug. 1, '88.....often made
Brantford Lock Works.....made

Brittan, Graham & Mathes, list Jan. 1890. 60&10&10%
 Barnes Mfg. Co. 33&22%
 Yale 40&40&10%
 Deitz Flat Key. net price
 Rome's Night Latches. 15%
 Brooklyn Latches. 50&10%
 Warner's Burglar Proof. # doz. \$3.00, 50%

Padlocks—

List June 10, 1891. 50&2%
 Norwich Lock Mfg. Co., old list. 50&2%
 Yale Lock Mfg. Co.'s. net prices
 Eagle. 40%
 Eureka, Eagle Lock Co. 40&2%
 Rome's Nos. 0 to 91. 30%
 Rome's Scandinavian, &c., Nos. 100 to 500. 15%
 A. C. Deitz. 40%
 Champion Padlocks. 40%
 Hotchkiss. 30%
 Star. 60%
 Horseshoe. # doz \$9, 50&50&10%
 Barnes Mfg. Co. 40&40&10%
 Nock's. 30%
 Scandinavian. 50&40%
 E. T. Fram's Keystone Scandinavian. 90&10%
 Nos. 119, 120, 130 and 140. 65%
 Other Nos. 40%
 Ames Sword Co. up to No. 150. 40%
 Ames Sword Co. above No. 150. 50%
 Slaymaker, Barry & Co.
 No. 1010 line. 90&5%
 No. 41 line. 50&5%
 No. 61 line. 60&5%
 No. 21 line. 76&10%

Sash, &c.—

Clark's No. 1, \$10; No. 2, \$8 # gr. 33%
 Ferguson's. 33%
 Victor. 60&10&2%
 Walker's. 10%
 Atwell Mfg. Co. 25&33%
 Reading. 66%&10&66%&10&10%
 Hammond's Window Springs. 40%
 Common Sense, Jap'd, Cop'd and Br'd. # gr \$4.00
 Common Sense, Nickel Plated. # gr \$10.00
 Universal. 30%
 Kempshall's Gravity. 60%
 Kempshall's Model. 60&60&10%
 Corbin's Daisy, list Feb. 15, 1888. 70%
 Payson's Perfect. 60&10&10%
 Huginn's Sash Balances. 25&5&2%
 Huginn's New Sash Locks. 25&5&2%
 Ives Patent. 60&10&50&10%
 Fish (Liesche's pat.), No. 100, # gr. \$8;
 No. 105, # gr. \$10. 50%
 Davis, Bronze, Barnes Mfg. Co. 60%
 Champion Safety list January, 1893. 70&5%
 Security. 70%
 Giant, list Jan., 1892. 70&5%
 Wolcott's. 60&10&5%
 Monarch. 50%

Lumber Tools—

See Tools, Lumber.

Lustro—

Four-ounce bottles. # doz, \$1.75; # gross. \$17.00

Machines.

Boring—

Without Augers. Upright. Angular.
 Douglas. \$5.50 \$6.75. 50%
 Snell's, Rice's Pat. 5.50 6.75. 40&10&10%
 Jennings. 5.50 6.75. 45&50%
 Other Machines. 2.55 2.75.
 Phillips' Patent with Augur. 7.00 7.50.
 Miller's Falls. 7.50 25%

Fluting—

Knox, 4 1/2-inch Rolls. \$3.25 each } 35%
 Knox, 6-inch Rolls. \$3.60 each }
 Eagle, 3 1/2-inch Rolls. \$2.15. 35%
 Eagle, 5 1/2-inch Rolls. \$2.35. 35%
 Crown, 4 1/2 in. \$3.50; 6 in. \$4.00; 8 in. \$4.50 each. 35%
 Crown Jewel, 6 in. \$3.50 each, 35%
 American, 5 in. \$3.00; 6 in. \$3.40; 7 in. \$4.50 each. 35%
 Domestic Fluter. each, \$1.50
 Geneva Hand Fluter, White Metal. # doz \$12, 25%
 Crown Hand Fluter, No. 1, \$15.00; 2, \$12.50; 3, \$10.00; 4, \$8.25. 30%
 Shepard Hand Fluter, No. 85, per doz \$15.50. 40%
 Shepard Hand Fluter, No. 110, # doz \$11.00. 40%
 Shepard Hand Fluter, No. 95, # doz \$8.00. 40%
 Combined Fluter and Sad Iron. # doz \$15.00. 30%

Hoisting—

Moore's Hand Hoist, with Lock Brake. 20%
 Moore's Differential Pulley Block. 40%
 Energy's Mfg. Co.'s. 25%
 Sure Grip Steel Tackle Blocks. 25%

Washing—

Anthony Wayne, # doz, No. 1, \$51; No. 2, \$45; No. 3, \$42.
 Western Star, # doz, No. 2, \$45; No. 2 \$48.
 Wellsell. # doz \$54.00
 Fair and Square. # doz \$42.00

Mallets—

Hickory. 20&10&20&10&10%
 Elm and Viburnum. 20&10&20&10&10%
 B. & L. Block Co., Hickory & L. V. 30&30&10%

Mattocks—Regular list.

60&10&60&10&5%

Measures—

Standard Fiberware, No. 1, peck. # dozen, \$3.50; 1/2 peck, \$3.00.

Meat Cutters—

See Cutters Meat.

Menders, Harness—

Per doz. \$2.00

Milk Cans—See Cans, Milk.

Mills—Coffee—

Box and Side, list Jan. 1, 1888. 60&60&10%
 Net prices are often made which are lower than above discount.
 American, Enterprise Mfg. Co., list Jan. 17, 1893. 20%
 The Swift, Lane Bros. 30%

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Best Machines: 10-in. \$4; 12-in. \$4.50; 14-in. \$5; 16 in. \$5.50; 18-in. \$6.
 Low-Grade Machines:
 10-in. \$3; 12-in. \$3.25; 14-in. \$3.50 each

Muzzles—

Safety. # doz, \$3.00, 25%

Nails—

Cut and Wire. See Trade Report.
 Wire Nails, Papered.
 Association list, May 1, '92. 80&10&10&5%
 Tack Mfrs' list. 70&50&70&10%
 Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos. 6 7 8 9 10
 American. 84 84 84 84 84. net
 Ausable. 25 26 26 26 26 23%
 Clinton, Fin. 19 17 16 15 14 30&10&2%
 Essex. 28 26 26 26 24 23%
 Lyra. 19 17 16 15 14 40&10%
 Snowden. 19 17 16 15 14 40&10%
 Vulcan. 23 21 20 19 18 25%
 Northwest'n. 25 23 22 21 20 25&25%
 A. C. 25 23 22 21 21 25&10&33%&5%
 C. B. K. 25 23 22 21 21 33%&33%&10%
 Maud S. 25 23 22 21 21 40&10&5%
 Champlain. 28 26 25 24 23 40&10&5%
 Saranac. 23 21 20 19 18 40&5%
 Champion. 25 23 22 21 20 10&10&10%
 Capewell. 19 18 17 16 15 10&5%
 Anchor. 23 21 20 19 18 35%
 Western. 23 21 20 19 18 50%
 Empire Bronzed. 13&14 14 13

Picture—

Brass Head, Sargent's list. 60&60&10%
 Brass Head, Combination list. 50&10%
 Porcelain Head, Sargent's list. 50&10&10%
 Porcelain Head, Combination list. 40&10%
 Niles' Patent. 40%

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—

See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Square. Hex.
 Hot Pressed. 3.80 6.50 off list
 Cold Punched. 5.00 6.10 off list
 In packages of 100, add 1-10¢ # b, net; in packages less than 100, add 1/2¢ # b, net.

Oakum—

Best or Government. # doz 63%&74%
 U. S. Navy. # doz 59%&66%
 Navy. # doz 56%&54%

Oil Tanks—See Tanks, Oil.

Oilers—

Zinc and Tin. 65&10&70&5%
 Brass and Copper. 50&10&50&10&5%
 Malleable, Hammers' Improved, No. 1. \$3.60; No. 2, \$4.00; No. 3, \$4.40 # doz. 10&10&5%
 Malleable, Hammers' Old Pattern, same list. 45%
 Prior's Pat. or "Paragon" Zinc. 60&10&10%
 Prior's Pat. or "Paragon" Brass. 50%
 Olmstead's Tin and Zinc. 60%
 Olmstead's Brass and Copper. 60%
 Broughton's Zinc. 60%
 Broughton's Brass. 60%
 Steel, Draper & Williams. 50%

Openers, Can—

Messenger's Comet. # doz \$3.00, 25%
 American. # gross \$2.75, \$3.00
 Duplex. # doz 25¢, 15¢&20%
 Lyman's. # doz \$3.75, 20%
 No. 4, French. # doz \$2.25, 55¢&80%
 No. 5, Iron Handle. # gr \$6.00, 45¢&50%
 Eureka. # doz \$2.50, 10%
 Sarsors. # doz \$2.75, 30%
 Star. # doz \$2.75
 Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50; 60%&70%
 Excelsior, No. 1, \$2.50; No. 2, \$1.50. 40%
 World's Best # gross, No. 1, \$12.00; No. 2, \$2.00. 50%
 Universal. # doz \$3.00. 50&10%
 Domestic. # doz \$2.00. 45%
 Champion. # doz \$2.00. 50%

Packing, Steam—

Rubber—

Standard. 70&70&10%
 Extra. 60&60&5%
 N. Y. B. & P. Co., Standard. 50%
 N. Y. B. & P. Co., Empire. 50%
 N. Y. B. & P. Co., Salamander. 25%
 Jenkins' Standard. # b 80¢. 25&25&5%

Miscellaneous—

American Packing. 10¢&11¢ # b
 Russia Packing. 14¢ # b
 Italian Packing. 13¢&14¢ # b
 Cotton Packing. 15¢&17¢ # b
 Jute. 7¢&8¢ # b

Pails—

Creamery—

S. S. & Co. 18-qt., \$7.00; 20-qt., \$7.25 per doz. 5%

Galvanized—

Quarts 10 12 14
 Hill's Light Weight, # doz. \$2.75 3.00 3.25
 Hill's Heavy Weight, # dz. 3.00 3.25 3.75
 Helwig's. 2.50 2.75 3.00
 Sidney Shepard & Co. 2.55 2.85 3.05
 Iron Cans. 2.50 2.75 3.00
 Fire Buckets. 2.75 3.25 3.50
 Buckets—See Well Buckets.

Indurated Fiber Ware—25%

Star Pails, 12 qt. # doz \$4.20
 Milk, 14 qt. # doz \$5.40
 Stable, 14 qt. # doz \$3.00
 Fire Pails, deep. # doz \$4.80
 Fire Pails, round bottom. # doz \$5.40

Standard Fiber Ware—

Water Pails, 12 qt., # doz. \$3.60 \$4.00
 Dairy Pails, 14 qt., # doz. 4.00 4.50
 Fire Pails, No. 1, 12 qt., # doz 4.00
 Fire Pails, No. 2, 14 qt., # doz 4.50
 Sugar Pails. 5.50 6.00
 Horse Pails. 4.50
 Bury Pails. 3.50
 Slop Jars (bal. trap). 7.50 8.50
 Chamber Pails, 14 qt. 6.00 7.00

Pans—

Dripping. # b 5 1/2
 Small sizes. # b 5 1/2
 Large sizes. # b 6
 Silver & Co. (Covered). 40%

Fry—

Standard List:
 No. 1. 1 2 3 4
 # doz. \$3.00 \$3.75 \$4.25 4.75 \$5.25
 # doz. \$6.00 \$7.00 \$8.00 \$9.00
 Polished, regular goods. 75¢&75¢&10%
 Acme Fry Pans. 66%

Dust—

Steel Edge, No. 1. # doz \$1.75

Roasting and Baking—

Columbia, S. S. & Co.: Nos. 10, \$2; 20, \$2.25; 30, \$2.50 each. 50%

Paper and Cloth—

Sand and Emery—

List April 19, 1888. 50&10&50&10&5%
 Sibley's Emery and Crocus Cloth. 30%

Parers—

Apple—
 Advance. # doz \$4.75
 Baldwin. # doz 5.25
 Bonanza. each 5.00
 Daisy. # doz 4.00
 Dandy. each 7.50
 Polished. # doz 4.25
 Eureka, 1888. each 16.00
 Family Bay State. # doz 12.00
 Favorite. # doz 5.00
 Gold Medal. # doz 4.00
 Ideal. # doz 4.00
 Improved Bay State. # doz 27.00&30.00
 Little Star. # doz 4.50
 McIntosh. # doz 4.50
 New Lightning. # doz 5.50
 Oriole. # doz 4.00
 Penn. # doz 4.00
 Perfection. # doz 4.00
 Pomona. # doz 4.00
 Rocking Table. # doz 6.00
 Turn Table. # doz 4.50
 Victor. # doz 13.50
 Waverly. # doz 4.00
 White Mountain. # doz 4.00
 72. # doz 4.25
 78. # doz 7.00

Potato—

White Mountain. # doz \$4.50
 Antrim Combination. # doz \$5.50
 Hoosier. # doz \$13.50
 Saratoga. # doz \$5.50

Pencils—

Faber's Carpenters. high list 50%
 Faber's Round Gilt. # gro \$5.25
 Dixon's Lead. # gro \$4.50
 Dixon's Lumber. # gro \$6.75
 Dixon's Carpenters. 10%

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00. 60&10&60&10&10%

Picture Nails—

See Nails, Picture.

Pinking Irons—

See Irons, Pinking.

Pins—

Humason, Beckley & Co.'s. 60&10%
 Sargent & Co.'s. \$17 and \$18. 60&10%
 Peck, Stow & W. Co. 50&10&50&10&5%
 Silvered Glass. net
 White Enamel. net

Escutcheon—

Iron, list Nov. 11, 1885. 50&10&50&10&5%
 Brass. 60&60&5%

Pipe, Wrought Iron—

List October 12, 1892.
 1 1/2 and under, Plain. 60&10%
 1 1/2 and under, Galv. 52%&10%
 1 1/2 and over, Plain. 70&10%
 1 1/2 and over, Galv. 60&10%
 Boiler Tubes, list Oct. 24, 1892. 65&10%
 Casing, list Nov. 15, 1892. 52%&10%
 Inserted joints Casing, list Nov. 15, 1892. 47%&5%
 Steel Boiler Tubes. 27%&5%
 Cold Drawn Seamless Steel Tubing. 50%

Planes and Plane Irons—

Wood Planes—
 Molding. 40&40&10%
 Bench, First quality. 45&45&10%
 Bench, Second quality. 50&50&10%
 Bailey's (Stanley R. & L. Co.). 50&10%

Iron Planes—

Bailey's (Stanley R. & L. Co.). 50&10%
 Miscellaneous Planes (Stanley R. & L. Co.). 25&10%
 Steers' Iron Planes. 50&50&5%
 Meriden Mal. Iron Co.'s. 50&50&5%
 Davis' Iron Planes. 50&50&5%
 Birmingham Plane Co. 60&60&5%
 Gage Tool Co.'s Self-Setting. 20&10&10%
 Chaplin's Iron Planes. 50&50&5%
 Sargent's. 80&60&10%
 Standard Tool Co. 50&50&5%

Plane Irons—

Butcher's. \$5.00&\$5.25 to \$1
 Buck Bros. 50%
 Auburn Thistle. 30&10%
 Ohio. 30&10%
 Sandusky. 30%
 L. & J. White. 30%
 Stanley R. & L. Co. 50&10%

Plates—

Felice. # b 60&60&4%

Pilers and Nippers—

Button's Patent. 60%
 Hall's No. 2, 5 in. \$13.50; No. 4, 7 in. \$21.00 # doz.
 Humason & Beckley Mfg. Co. 50&50%
 Lindsay's Giant. 30%
 Gas Pliers. 60%
 Gas Pliers, Custer's Nickel Plated. 60&2%
 Eureka Pliers and Nippers. 40%
 Russell's Parallel. 25%
 P. S. & W. Cast Steel. 50%
 P. S. & W. Timmers' Cutting Nippers. 40%
 Carew's Pat. Wire Cutters. 20%
 Morrill's Parallel, # doz, \$12.00. 30&2%
 Cronk's 8 in. \$15.00; 10 in. \$21.00. 50&50&2%
 Cronk's Button Pattern. 50&10&60%
 Cronk's Carrier Pliers. 60&60%

Plumbs and Levels—

Regular List. 75&10&75&10&2%
 Stanley's Duplex. 30&10%
 Stanley's Handy. 20&10%
 Disston's. 50%
 Cook's. 40&10%
 Pocket Levels. 70&10&70&10&10%
 Davis Iron Levels. 40&10%

Poachers, Egg—

Buffalo Steam Egg Poachers, # doz, No. 1, \$3.00; No. 2, \$9.00. 33%
 Silver & Co., 6-Ring, # doz, \$4.00; 3-Ring. \$2.00

Pokes, Animal—

Bishop & I. X. L. # doz \$6.00
 Bishop's O. K. # doz \$5.25
 Bishop's Pioneer. # doz \$3.75
 Bishop's American. # doz \$2.75
 Eagle, Double Stale. # doz \$5.75
 Eagle, Single Stale. # doz \$3.75
 Buckeye, Single Stale. # doz \$2.75
 Bolding. # doz \$3.50
 Metallic Horse Poke. # doz. \$6.00

Police Goods—

R. I. Tool Co., Handcuffs, \$15.00 # doz 10%
 R. I. Tool Co., Leg Irons, \$25.00 # doz 10%
 Towler's. 25%
 Daley's Improved Handcuffs, 2 Hands, Polished, # doz, \$48.00; Nickleled, \$57.00; 3 hands, Polished, # doz, \$72.00; Nickleled, \$84.00. 25%
 J. P. Lovell's Police Goods. 25%

Polish—

Metal—

Prestoline. 30%
 Prestoline Paste. 33%
 Gaston's Silver Compound. 33%

Stove—

Joseph Dixon's. # gro, \$6.00, 10%
 Gem. # gro, \$4.50, 10%
 Gold Medal. # gro, \$6.00, 25%
 Lustro. # gro, \$4.75
 Ruby. # gro, \$3.75
 Rising Sun, 6 gro lots. # gro, \$5.50
 Dixon's Plumbago. # gro \$13.00

Snaps, Harness, &c.

Anchor (T. & S. Mfg. Co.)	85¢
Fitch's (Bristol)	50¢10¢
Hotchkiss	10¢
Andrews	50¢
Sargent's Patent Guarded	70¢10¢10¢
German, new list	40¢10¢
Covert	50¢10¢5¢
Covert, New Patent	60¢10¢5¢
Covert, New R. E.	60¢10¢5¢
Covered Spring	60¢10¢10¢
Covert's Saddlery Works' Triumph	33¢
John Protz Snaps	75¢75¢5¢

Snaths, Scythe

List	50¢50¢5¢
------	----------

Soldering IronsSee *Irons, Soldering.***Spittoons, Cuspidors, &c.**

Standard Fiberglass	
Cuspidors, 8½-inch, # doz., No. 5, \$8; No. 5, \$9.	
Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, \$8.	

Spoke ShavesSee *Shaves, Spoke.***Spoke Trimmers**See *Trimmers, Spoke.***Spoons and Forks**

Tinned Iron

Basting, Cen. Stamp, Co.'s list	70¢10¢
Solid Table and Tea, Cen. Stamp, Co.'s list	70¢10¢
Buffalo, S. S. & Co.	33¢4¢2¢

Silver Plated

months or 5¢ cash 30 days:	
Madden Bros. & Co., Rogers	40¢15¢
O. Rogers & Bros.	40¢15¢
Rogers & Bros.	40¢15¢
Reed & Barton	40¢40¢5¢
Wm. Rogers Mfg. Co.	40, 15¢5¢
Simpson, Hall, Miller & Co.	40, 15¢5¢
Holmes & Edwards Silver Co.	40, 15¢5¢
L. Boardman & Son	50¢12¢5¢

Miscellaneous

Holmes & Edwards Silver Co.	
No. 87 Mexican Silver	50¢10¢5¢
No. 30 Silver Metal	50¢10¢5¢
No. 24 German Silver	50¢10¢5¢
No. 60 Nickel Silver	50¢10¢5¢
No. 48 Nickel Silver	50¢10¢5¢
Wm. Rogers Mfg. Co.	
Rogers' Silver Metal	50¢10¢5¢
18¢ Rogers' German Silver	60¢8¢
22¢ Rogers' Nickel Silver	50¢8¢
German Silver	50¢60¢5¢
German Silver, Hall & Elton	50¢50¢10¢5¢
Nickel Silver	50¢50¢10¢5¢
Britannia	60¢60¢5¢
Boardman's Nickel Silver, list July 1, 1891	60¢7½¢5¢
Boardman's Britannia Spoons, case lots	60¢5¢ cash

Spring

Torrey's Rod, 39 in.	¢ doz \$1.20¢1.2
Warner's No. 1, # doz \$1.50; No. 2, \$3.40	
Gem (Coil), list April 19, 1892	55¢65¢10¢
Star (Coil), list April 19, 1892	20¢10¢
Victor (Coil)	60¢10¢60¢10¢5¢
Champion (Coil)	60¢10¢60¢10¢5¢
Covell's No. 1, # doz \$1.00; No. 2, \$1.50	
Rubber, complete, # doz \$4.50	50¢50¢10¢
Verucles	50¢50¢10¢
Phoenix	33¢

Carriage, Wagon, &c.

Elmptie, Concord, Platform and Half Scroll	
60¢10¢60¢10¢10¢10¢ or net prices	
Chiff's Bolster Springs	25¢

Squares

Steel and Iron	85¢85¢5¢
Nickel-Plated	85¢85¢5¢
Try Square and T Bevels	60¢10¢10¢
Disston's Try Square and T Bevels	50¢
Waterbottom's Try and Miter	80¢10¢
Starrett's Micrometer Caliper Squares	25¢
Avery's Flush Bevel Squares	40¢
Avery's Bevel Protractor	50¢

Squeezers

Fodder

Blair's	¢ doz \$2.00
Blair's "Climax"	¢ doz \$1.25

Lemon

orcelain Lined, No. 1	¢ doz \$6.00
-----------------------	--------------

Wood, No. 2	¢ doz \$3.00, 35¢
Wood, Common	¢ doz \$1.70¢1.75
Dunlap's Improved	¢ doz \$3.75, 20¢
Sammis, No. 1, \$5.00; No. 2, \$3; 12	
118 # doz	25¢10¢
Jennings' Star	¢ doz \$2.50
The Boss	¢ doz \$2.50
Dean's, Nos. 1, # doz \$6.50; 2, \$3.35; 3, \$1.90; Queen, \$2.50	
Little Giant	50¢50¢5¢
King	40¢5¢
Hotchkiss Straight Flash	¢ doz \$12.00
Silver & Co., Glass	¢ gro. \$9.00

Standard Fiber WareSee *Ware, Standard Fiber.***Staples**

Barbed Blind, ¼ in. and larger, # 7/7¢	
Barbed Blind, ¼ in.	¢ doz \$8.35¢
Fence Staples, Galvanized, # 1 as B'v Wire	
Fence Staples Plain	¢ doz \$2.00
Grand Crossing Tack Co.'s list	75¢10¢

Steelyards

40¢10¢50¢	
-----------	--

Stocks and Dies

Blacksmith's:	
Waterford Goods	35¢
Butterfield's Goods	35¢
Lighting Screw Flat	25¢30¢
Beece's New Screw Flat	25¢30¢
Reversible Ratchet	30¢
Gardner	25¢
Green River	25¢30¢

Stops, Bench

Morrill's, # doz., Nos. 1, \$9.50; 2, \$12.00	
40¢20¢	
chick's, # doz \$5, 10¢10¢10¢	
Weston's, No. 1, \$10 No. 2, \$9, 25¢10¢5¢	

McGill's, # doz \$3.	10¢
Cincinnati	25¢10¢
Terrill's Nos. 1 and 2, # doz. \$3; No. 3, \$3.60	30¢

StoneJstones, Grind—See *Grindstones.***Scythe Stones**

Pike Mfg. Co., list April, 1892.	33¢
Cleveland Stone Co., list Nov. 1892.	33¢

Oil Stones, &c.

Pike Mfg. Co.:	
Hindustan No. 1, # D...	8¢
Sand Stone	5¢
Turkey Oil Stone, 4 to 8	40¢40¢
In	10¢
Turkey Slips	20¢
Washita Stone, Extra	50¢
Washita Stone, No. 1	40¢
Washita Stone, No. 2	30¢
Washita Slips, Extra	80¢
Washita Slips, No. 1	70¢
Arkansas Stone, No. 1, 3 to 5	in, \$2.80
Arkansas Stone, No. 1 ½ to 3	33¢50¢
Lake Superior	¢ D 13¢
Lake Superior Slips	¢ D 20¢

Stove PolishSee *Polish, Stove.***Stretchers, Carpet**

Cast Steel Polished	¢ doz \$2.2
Cast Iron, Steel Points	¢ doz \$75¢80¢
Socket	¢ doz \$1.75
Bullard's	25¢25¢10¢

Strops, Razor

Genuine Emerson	60¢60¢5¢
Imitation	¢ doz \$2.00, 20¢10¢5¢
Torrey's	20¢
Badger's Belt and Com.	¢ doz \$2.00
Lamont Combination	¢ doz \$4.00
Grassman's Pat. Fodder, list Nov. 1, 1892	50¢50¢
Electric Cutlery Co.	Net
Campbell Cutlery Co.	Net

Stuffer, Sausage

Miles' Challenge, # doz \$20.	50¢50¢5¢
Perry, # doz, No. 1, \$15.00; No. 0, \$21.00	
Draw Cut No. 4, each \$30.00	50¢50¢10¢
Enterprise Mfg. Co., list Jan 17, '93, 25¢ Silver's	40¢10¢

Sweepers, Carpet and Lawn

Carpet

Bissell No. 5	¢ doz \$17.00
Bissell No. 8	¢ doz \$20.00
Bissell, Grand	¢ doz \$36.00
Standard	¢ doz \$24.00
Domestic	¢ doz \$21.00
Domestic, No. 2	¢ doz \$22.00
Grand Rapids	¢ doz \$24.00
Crown Jewel, No. 1, \$18.00; No. 3, \$20.00	
Magic	¢ doz \$15.00

Improved Parlor Queen

Nickel	¢ doz \$27.00
Japanned	¢ doz \$24.00
Exterior	¢ doz \$22.00
Garland	¢ doz \$19.00
Parlor Queen	¢ doz \$24.00
Housewife's Delight	¢ doz \$15.00
Ladies' Friend	¢ doz \$15.00
Ladies' Friend No. 2	¢ doz \$16.00
Advance	¢ doz \$18.00
Our Leader	¢ doz \$20.00
Truth	¢ doz \$20.00
Goshen	¢ doz \$21.00
Supreme	¢ doz \$22.00
Easy	¢ doz \$22.00
Gilt Edge	¢ doz \$24.00
Acme	¢ doz \$24.00
Imperial	¢ doz \$26.00
Grand Republic	¢ doz \$30.00
Banner	¢ doz \$22.00
The Star	¢ doz \$21.00
Reliable	¢ doz \$22.00
The Rapid	¢ doz \$22.00
Our Own	¢ doz \$27.00
Model	¢ doz \$27.00
Goshen Sweeper	¢ doz \$27.00
Rapids, Mich., make the following re-bates:	
5 dozen in 6 months	¢ doz \$1.00
10 dozen in 6 months	¢ doz \$2.00
25 dozen in 6 months	¢ doz \$3.00
Except on L.F., when 10 dozen price is \$13.50, and 25 dozen \$18.00.	

Lawn

Thompson Mfg. Co.	30¢
-------------------	-----

Swings

Davies Lawn	25¢
-------------	-----

Tacks, Brads &c.

List October 19, 1889. Old established straight weights. Short Weight goods are sold at lower prices.

Carpet Tacks	
American, Blind and Cop'd.	60¢
Steel, Bright and Blued	70¢
Steel, Tinned and Coppered	60¢
Swedes Iron, Blued	72¢
Swedes Iron, Tinned	75¢
American Iron Tacks, Domestic	60¢
Swedes Iron Tacks	
S. S., Blued	60¢
S. S., Tinned	70¢
Lanc., Blued	50¢
Lanc., Tinned	60¢
Gimp and Lace Tacks	
S. S., Blued	62¢
S. S., Tinned	60¢
Lanc., Blued	55¢
Lanc., Tinned	60¢
Basket and Trimmers' Tacks	
Lanc.	52¢
S. S.	60¢
Hungarian Nails	80¢
Common and Patent Brads	50¢
Leathered Tacks	10¢
Brush Tacks, S. S.	80¢
Looking Glass Tacks, S. S.	35¢
Picture-Frame Points, S. S.	35¢
Finishing Nails	80¢
Trunk and Clout Nails	
Black	82¢
Tinned or Coppered	60¢
Basket Nails	60¢
Chair Nails	52¢
Cigar Box Nails	45¢
Tin Capped Nails	50¢

Miscellaneous

Double Point	90¢90¢10¢
Wire Carpet Nails	50¢10¢
Claw Handle Carpet	¢ gross \$4.00
Bonnie Blue	¢ box 1 50

Bill Nye Brad Box	4 00
Parisian Gilt Nails, cartoon	50
Home Tacks, No. 50 # case (12 cartons), \$36.00; No. 100, # case (12 cartons), \$72.00	
Home Tacks, No. 300, # case (12 cartons), \$30.00; No. 400, # case (12 cartons), \$60.00	
Upholsterers' Nails	50¢10¢

Wire Brads and Nails

Steel-Wire Brads, R. & E. Mfg. Co.'s list	50¢10¢
---	--------

See also *Nails, Wire.***Tanks, Oil**

Emerald, S. S. & Co.: 30-gal. \$3.75; 60-gal. \$11 each	50¢10¢
---	--------

Tapes, Measuring

American	40¢40¢5¢
Spring	15¢
Chesterman's, Regular list	25¢30¢

Thermometers

Tin Case	80¢80¢10¢
----------	-----------

Thimble Skeins—See Skeins.**Ties, Bale—Steel.**

Standard Wire, list	50¢10¢5¢
---------------------	----------

Tinners' Shears, &cSee *Shears, Tinners' &c.***Tinware**

Stamped, Japanned and Pleded, list Jan 20, 1887	70¢10¢70¢25¢
---	--------------

Tire Benders, Upsetters, &c.—See Benders and Upsetters, Tire.**Tobacco Cutters**See *Cutters, Tobacco.***Tools**

Coopers

Bradley's	20¢
Barton's	20¢20¢5¢
L. & J. White	20¢5¢
Albertson Mfg. Co.	25¢
Beatty's	30¢
Sandusky Tool Co.	30¢30¢5¢
Shaves Cincinnati Tool Co.	20¢

Lumber

Ring Peavies, "Blue Line"	¢ doz \$20.00
Ring Peavies, Common	¢ doz \$18.00
Steel Socket Peavies	¢ doz \$21.00
Mail Iron Socket Peavies	¢ doz \$19.00
Cant Hooks, "Blue Line"	¢ doz \$16.00
Cant Hooks, Common Finish	¢ doz \$14.00
Cant Hooks, Mail Socket Clasp, "Blue Line" Finish	¢ doz \$16.00
Cant Hooks, Mail Socket Clasp, Common Finish	¢ doz \$12.00
Hand Spikes	¢ doz 6 ft., \$15.00; 8 ft., \$17.00; 10 ft., \$19.00
Pike Poles, Pike & Hook	¢ doz, 12 ft., \$11.50; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50
Pike Poles, Pike only	¢ doz, 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00
Pike Poles, not ironed	¢ doz, 12 ft., \$9.00; 14 ft., \$7.00; 16 ft., \$9.00; 18 ft., \$12.00; 20 ft., \$16.00
Setting Poles	¢ doz, 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00
Swamp Hooks	¢ doz \$18.00

Saw

Atkins, new list	40¢
------------------	-----

Transom LiftersSee *Lifters, Transom.***Traps**

Game

Newhouse	40¢40¢5¢
Oneida Pattern	70¢10¢
Game, Blake's Patent	40¢10¢5¢

Mouse and Rat

Mouse Wood, Choker	¢ doz holes 9¢10¢
Mouse, Round Wire	¢ doz \$1.50, 10¢
Mouse, Cage, Wire	¢ doz \$2.50, 10¢
Mouse, Catch-em-alive	¢ doz \$2.50, 15¢
Mouse, Bonanza	¢ doz 0.90¢1.00
Rat, Decoy	¢ gr \$10.00, 10¢
Ideal	¢ gr \$10.00
Cyclone	¢ gr \$5.25
Hotchkiss Metallic Mouse, 5-hole traps	¢ doz, 75¢; in full cases, ¢ doz 60¢65¢
Hotchkiss Imp. Rat Killer	¢ gro \$18.50
Hotchkiss New Rat Killer	¢ gro \$16.50
Schuyler's Rat Killer	¢ gro \$15.00
Dandy	¢ doz., \$1.75

Triers

Butter and Cheese	25¢
-------------------	-----

Trimmers, Spoke

Bonney's	¢ doz \$10.00, 50¢
Stearns'	20¢10¢
Ives', No. 1, \$15.00; No. 2, \$12.00	
55¢	
Douglas'	¢ doz \$9.00, 20¢
Cincinnati	25¢

Trowels

Lothrop's Brick and Plastering	</
--------------------------------	----

Wringers, Clothes—
 Am. Wringer Co.'s list, Jan 2, '93. 2% cash
 Colby Wringer Co. list, Sept. 1, '91. 2% cash
 Lovell Mfg. Co. list, Jan 1, 1892. 2% cash
 Peerless Mfg. Co., list Feb., 1892. 2% cash
 National Wringer & Mfg. Co. list
 June 1, 1892. 2% cash

Wrought Goods—
 Staples, Hooks, &c., list March 17, 1892
 85&10@85&15%

Glue—			
Low Grade.....	7	@	10
Cabinet.....	12	@	14
Medium White.....	13	@	15
Extra White.....	17	@	20
French.....	10	@	23
English.....	10	@	15
Irish.....	12	@	..

Hosted by Google

APRIL 5, 1893.

Hosted by Google

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

GoogleTM books

<https://books.google.com>

